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TOOTH-BILLED RED TANAGER,
PIRANGA FLAVA

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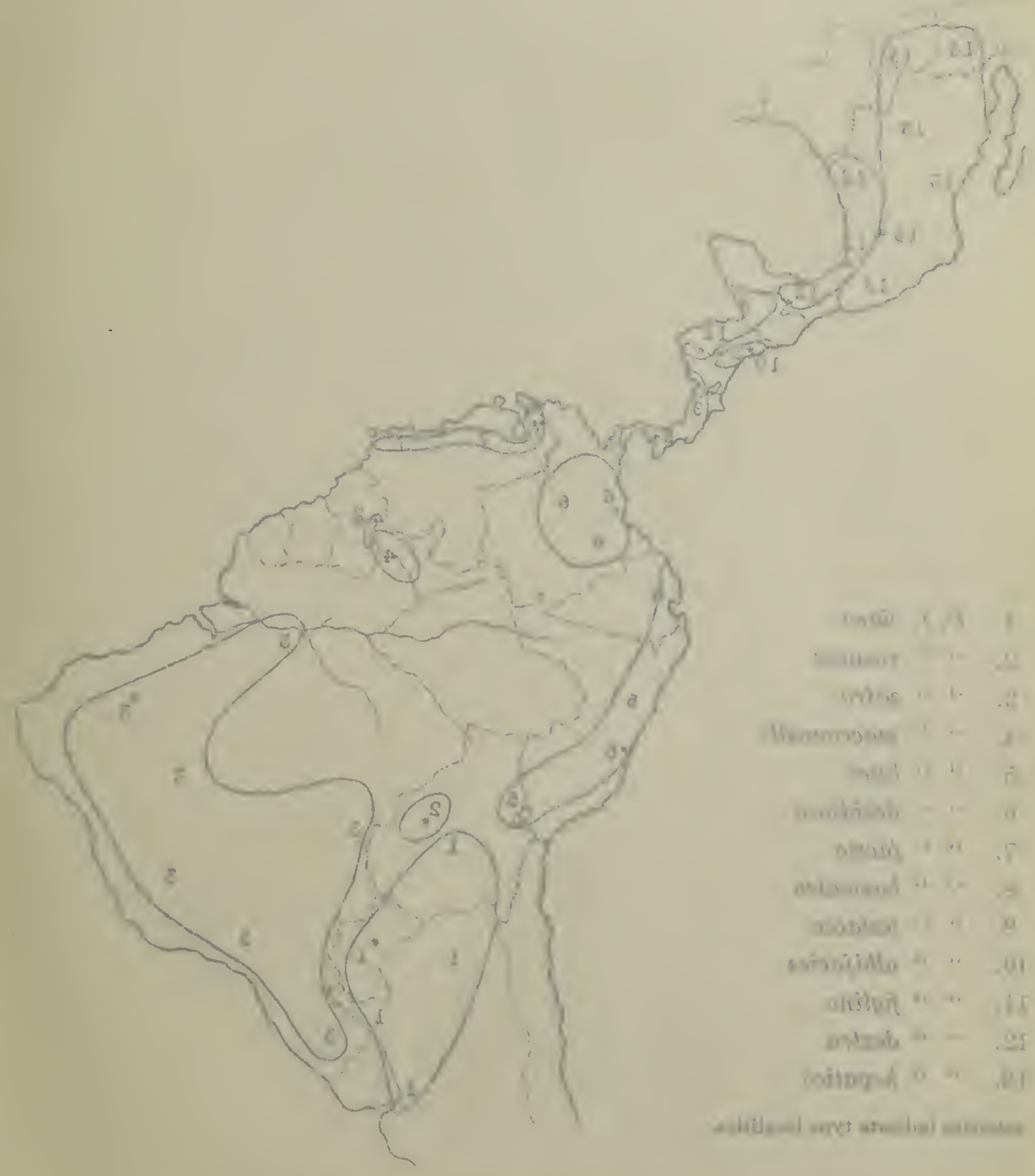
CURATOR, DEPARTMENT OF ZOOLOGY

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DISTRIBUTION OF RANGIA PLENA



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A STUDY OF THE TOOTH-BILLED RED TANAGER, *PIRANGA FLAVA*

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The present study began in a comparative examination of the various tanagers allied to *Piranga testacea* with the object of determining the affinities and relationships of the Peruvian race *lutea*, long known as *tschudii*. As the examination has progressed, it has become evident that certain members of the genus *Piranga* occupy positions of much closer relationship to *testacea* than have been accorded them in recent years. These relationships have been suggested occasionally by different authors, and hints may be found in the scattered literature on the group where, at one time and another, the forms have been variously united or combined.

Ridgway (Baird, Brewer, and Ridgway, Hist. N. A. Birds, 1, p. 434, 1874) once considered *testacea* as a race of *saira*, and *azarae* (= *flava*) as a race of *hepatica*. D'Orbigny (Voy. Am. MÉR., Ois., p. 264, 1839) included certain specimens from Chiquitos, Bolivia, in the account of his *azarae* (= *flava*), while, more recently, Todd (Proc. Biol. Soc. Wash., 35, p. 92, 1922) described the Chiquitos birds as a new race of *saira*, *rosacea*. Salvin and Godman (Biol. Cent. Amer. Aves, 1, p. 293, 1883) commented on the slight differences which separate *testacea* (including the more recently described *lutea* and *desidiosa*), *azarae* (= *flava*), *hepatica*, and *haemalea*.

Examination of numerous specimens of these forms and certain of their unquestioned allies has fostered the belief that all are races of a single species whose distribution extends from eastern Argentina to southwestern United States with little interruption in continuity, though with lateral extensions into Brazil and the Guianas and into Venezuela and the Guianas in two lines of development which meet at their outward extremities. Throughout this extensive group, the color, general pattern, size, shape of bill, and other major characters are substantially identical or are subject to variability which largely overcomes the individual differences. There are certain features of

plumage and molt which seem to be present in all the forms under consideration but which are different from those of the other congeneric groups. The various forms replace each other geographically in all parts of the range. Finally, at the northern and southern extremities forms are produced which are strikingly alike in racial characters that are not shared by the intervening subspecies.

These considerations together present a volume of evidence that is more than circumstantial. There is no question that all the forms under discussion are of common phylogenetic origin. Some of them are more strongly differentiated than others, some distinctly intergrade with adjacent forms, while others are separated from their nearest allies by so slight a gap in proportion to the individual variation in that direction that the relationship is not seriously impaired. In the following treatment, therefore, I have considered as races of *P. flava* all the forms under discussion. I have omitted *roseo-gularis* and *cozumelae* which I believe to be sufficiently distinct from the remainder to warrant their retention in a separate species although their affinities are much closer to *flava* than to any other member of the genus *Piranga*.

HABITAT

Piranga flava is a bird of the somewhat open woods, the edges of groves, and scattered trees in the open. At certain seasons it may be found in heavy forest in flocks of its own or associated with vagabond troops of mixed origin, but at breeding time it seems to return to the more open situations. In the most northern localities it particularly favors the pine-covered slopes of the mountains and the clumps of oaks in pine districts up to 9,000 feet (Bailey, Birds New Mexico, p. 667, 1928). In Mexico it is found from sea level up to some 3,000 meters on the eastern coast (Sumichrast, Mem. Bost. Soc. Nat. Hist., 1, pt. 4, p. 549, 1869—'*hepatica*' = *dextra*; Vera Cruz) and winters also at sea level on the Pacific side below Colima (Beebe, Two Bird Lovers in Mexico, pp. 306, 395, 1905—*hepatica*). These tropical coastal records provide evidence that the pine and oak association is not constant at all seasons.

In northeastern Guatemala, at Poctum, *figlina* inhabits the pine ridge (Ridgway, Bull. U. S. Nat. Mus., 50, pt. 2, p. 88, 1902) and in Salvador *albifacies* is found in pine-oak territory at about 3,500 feet (Van Rossem, MS.). Costa Rican records of *testacea* are from the Pacific lowlands and upper Caribbean slopes up to about 5,000 feet on the central plateau (Carriker, Ann. Car. Mus., 6, p.

855, 1910). Carriker describes *testacea* as an inhabitant of heavy forest, having secured three females at La Hondura, but he records having noted another bird at Boruca which he says is mixed woodland and savanna. In Panamá, Griscom (Am. Mus. Novit., 282, p. 10, 1927) records '*testacea* subspecies' from Cape Garachiné which he describes as arid tropical; apparently it is much like the country about Colima, Mexico, where *hepatica* was found in winter.

In Ecuador, *lutea* has been taken at sea level at Esmeraldas (Chapman, Bull. Am. Mus. Nat. Hist., 36, p. 614, 1917—'*testacea*'). This race was described originally from Callao, Perú, which is at sea level, and I have taken it at about 3,500 feet elevation at Santa Eulalia, above Callao, in similar arid tropical country, as well as at 10,400 feet in the arid temperate zone of the upper Marañón River, and at 5,700 feet in humid subtropical conditions at Chinchao.

In Argentina, Uruguay, Paraguay, and parts of Bolivia, *flava* inhabits the open or sparsely wooded 'campos' at low elevations. Kerr (Ibis, 1892, p. 124) mentions its occurrence in open plains with scattered patches of scrubby trees. In winter it has been found in the wooded ravines of the sierras although as spring approaches it is said to abandon the mountains gradually and occupy the more open valleys (White, P. Z. S. London, 1883, p. 37). Wetmore (Bull. U. S. Nat. Mus., 133, p. 392, 1926) notes it as common in forested areas where it is found with bands of other small birds in forest growth, usually in taller trees; since these notes do not refer to breeding examples they do not necessarily conflict with those of Kerr and White. D'Orbigny (Voy. Am. Mér., Ois., p. 264, 1839) gives the range as from near sea level to 2,000 meters. Exact vegetational associations have not been reported.

Northward, *saira* and *macconnelli* occur in sparsely wooded campos such as at Chapada, Matto Grosso, 2,500 feet. They are not reported from forested regions which lack all traces of open country. Still farther northward, *faceta* inhabits foothills and the lower mountain slopes in dry woods, avoiding excessive humidity, ranging from 2,000 to 5,000 feet in the Santa Marta region (Todd and Carriker, Ann. Car. Mus., 14, pp. 488-489, 1922); *haemalea* was described from Mt. Roraima, but all the evidence at hand tends to show that it does not inhabit the forest but rather the savanna at the foot of the mountain. It has been taken also at Quonga and Annai, farther to the eastward, at the edge of savanna country.

Thus there is seen to be a certain variability in habitat according to locality and season, and the species apparently is not prohibited

from visiting certain regions outside of its breeding range through absence of a particular vegetational association, although it has some preferences. The zonal distribution of the species as a whole can not be given in general terms except to this extent, that the species does not commonly inhabit lowland tropical forest, that it prefers the lower slopes of the mountains and open woods but may be found in arid tropical regions where there is some growth of trees, and that it extends its range upwards on wooded mountain slopes where the forest is broken either by more open patches or by clearings. When savanna meets dense forest, it may occupy the edges of the woods.

MIGRATION

The migratory habit of the species has not been studied thoroughly. It is developed in north-temperate latitudes (in *hepatica*), but there is no evidence to show that it does more than carry the most northerly breeding individuals southward in winter just far enough to give them a warm climate for that season; those individuals which breed in such a climate may remain in the same latitude throughout the year. There is, however, some vertical or altitudinal migration and apparently also a certain vagrancy in tropical and subtropical regions which leads some of the races into territory in which they do not remain to breed.

PLUMAGES AND MOLTS

A general description may be drawn up for the entire species, to serve as a basis for comparison of the various races. Fully plumaged males are some tint or shade of red or scarlet-red, darker on the back, paler and clearer below, with a varying amount of duller shading on the flanks and across the breast. The lores are grayish or dusky white with a greater or lesser amount of red at the tips of the feathers; this pale area may be restricted to the lores or extended to include the chin, the anterior part of the malar region, and the auriculars, in varying amount. The top of the head may be uniform with the back or somewhat paler and brighter on the upper margin of the lores, across the forehead, or over the entire crown. The rump and upper tail-coverts are slightly brighter than the back; the under tail-coverts are usually brighter than the belly. The wings and tail are dark brown edged externally on quills and coverts with a tint of red somewhat brighter than the back. The under wing-coverts are pink; the inner margins of the remiges are dull

pink. The bill is blackish with a more or less pronounced pale spot on the gonys behind the tip, and is usually strongly toothed in the middle of the maxillary tomia. The size of this tooth varies within the limits of every race and in some specimens there is little trace of it, but the adult bill is always dark in color.

Females are olive yellow or green above and clear yellow below, with as much variation in tone as occurs in the red of the males. The pattern is that of the male with yellow or green replacing red. The bill is the same in both sexes.

The adult plumage of both sexes is modified by grayish edgings, dusky suffusions, and lighter or darker tones of the colors, and by extension or reduction of certain areas of pattern. These modifications, with an occasional difference in size, produce all the varieties of the species; there is no pronounced differentiation in any form.

Immature specimens of most of the races have not been available for study. A few scattered examples, mostly of molting birds which retain various portions of immature plumage, have made it possible to determine certain general characteristics. Young birds appear to be somewhat similar to adult females but are duller and browner, with obscure dusky streaks or dusky centers on most of the body plumage. The rectrices are more acute at the tips, the upper wing-coverts are margined with yellowish or buffy tints, and the outer remiges are edged with dull white or yellow. A young *hepatica* is described in detail under that race and such traces of immature plumage as have been found in other races are described similarly in their places.

Very little information is on record regarding the changes of plumage due to age and season. From the evidence at hand the case appears to be complicated. Regardless of race or locality, many apparently adult males exhibit considerable irregularity or variety in the combination of red and green or yellow feathers. Different individuals are molting variously from red to red, from yellow and green to the same, from red to yellow, from yellow to red, or from particolor to particolor or to entire red or yellow. In certain instances, red birds not in molt exhibit yellow feathers at scattered places throughout the plumage, with these yellow feathers considerably fresher and less worn than the surrounding red ones as though accidental loss had resulted in the replacement of the missing feathers by some of the other color.

Perhaps the most curious specimen of mixed molt that I have examined is a male of *figlina* from the Segovia River, Honduras

(U. S. Nat. Mus. No. 112,092). The left wing of this specimen shows the innermost secondaries fresh yellowish green replacing old worn red plumes; the right wing shows fresh red secondaries replacing worn yellowish ones. New primaries on the right are red; old ones on the left are red.

In all, about forty-five percent of the apparently adult males examined of all the races show some traces of green or yellow in the plumage. Swarth (Pac. Coast Avif., 4, p. 47, 1904) reports that of the male *hepatica* seen by him in the Huachuca Mountains, there were hardly any that did not show some greenish yellow feathers. He also reports a breeding male, taken June 2, in full green and yellow, strikingly like the females but larger. Among a series of *saira* from Matto Grosso, Brazil, I have found two birds in plumage similar to the female but both sexed as males (Amer. Mus. Nat. Hist. Nos. 32,031 and 32,014). Both are without any signs of immaturity. Scott (Auk, 5, p. 30, 1888) notes that specimens of *hepatica* taken early in September demonstrate that in fall the males assume a plumage like that of the adult female and adds that he has found males in similar but not identical plumage breeding late in June. Scott's conclusions, however, seem to need some modification.

Todd and Carriker (Ann. Car. Mus., 14, pp. 488, 489, 1922) remark that, in the Santa Marta region, males of *faceta* in first winter plumage resemble the adult females but that it is not clear whether or not they breed in this plumage. Four specimens are mentioned as having been taken from June 16 to August 2 in various stages of molt from this immature (first winter) plumage into adult dress, presenting mixed red and yellow coloration.

The actual breeding time of most of the races has not been recorded and is determinable in some cases only through immature specimens. The breeding time of *hepatica* seems to be June and July. Bertoni (Hornero, 1, p. 190, 1918) found *flava* at Misiones, Argentina, breeding early in October. Carriker's notes mention several nests and eggs of *faceta* but give no dates for them. I have examined a young male of *faceta* from Caracas, Venezuela (Field Mus. Nat. Hist. No. 34,684), taken in March, which is in first annual plumage of green and yellow although it retains a few juvenal feathers not yet lost in the molt. Chapman (Bull. Am. Mus. Nat. Hist., 7, p. 323, 1895) records a male '*haemalea*' (= *faceta*), taken at Caura, Trinidad on April 21, in the plumage of the female but

with testes measuring about .18 inch in longer diameter, showing breeding time to be not far distant. Allen (Bull. Am. Mus. Nat. Hist., 21, p. 279, 1905) gives the general breeding season for birds in the Santa Marta region as from about the first of April to the middle of June, although no *Piranga* is mentioned in this connection.

In Perú I found no nests of *lutea*, but other birds were breeding in the vicinity where it was collected in latter April, at the close of the rainy season. An August bird is in mixed plumage, with some distinctly yellowish brown feathers of comparatively fresh texture among worn and abraded red ones. Another male, taken in November, is replacing worn yellow by fresh red throughout.

A series of specimens of *hepatica* and *dextra* (which occupy adjacent regions in Mexico and southwestern United States), taken in January and every month from March to October, demonstrates a complete molt beginning in July and finished in October, after which there is a gradually increasing amount of abrasion and bleaching until, at the breeding season, the birds are very worn and faded. In this series the first to show any molt is a male, dated July 22, in which the following areas only are affected—forehead, chin, upper breast and sides, interscapulars, middle rectrices, inner primaries, and greater wing-coverts. An example dated August 15 shows the renewal of plumage to have progressed farther posteriorly. On September 24 the molt is still more advanced and almost complete; on October 19 it is perfectly complete. January 4 shows a bird in fresh, comparatively unworn plumage. On March 5, 21, and 22 some abrasion is evident; April 13, 24, and 25 abrasion is increased; May 27 there are traces of fading; June 5 and 22 there is increased fading and wear; July 2 shows a ragged, worn, and disreputable plumage in the last stage before the molt which, as shown above, is in progress on July 22.

There is no indication of any prenuptial or other partial molt in any of these specimens, nor is there any place in the sequence where transformation could occur undetected except at the unlikely period between October 19 and January 4, immediately after the annual molt is complete. There are a few specimens throughout the series which show the renewal of an occasional odd feather or so, presumably lost by accident, but these renewals are too irregular and asymmetrical to form part of a true molt.

Young birds by their post-juvenal molt apparently pass from the juvenal streaked plumage into the dress of the adult female

which they wear through the following breeding season. That this post-juvenal molt is sometimes only partial is suggested by several specimens which have retained certain parts of the juvenal plumage after the molt seems to be complete. At the following annual molt the young males may acquire some red feathers but it is uncertain whether any of them obtain a fully red costume at this time. Possibly a gradually increasing amount of red is secured year by year until the entire plumage is red, but, on the other hand, some males may never acquire a fully red dress but may continue in particolored costume throughout life. A few examples appear to have the general tone of red modified by an orange tint without the possession of any definite areas of green or yellow. *Piranga erythromelas* shows the same tendency at times.

The significance of these peculiarities is not easily determined. It seems possible that the males of *Piranga flava*, most of whose races are intertropical and non-migratory, have almost completely lost the faculty, once possessed, of assuming the female plumage during the winter. A repressed ability in this direction is shown by the adventitious renewal feathers and by the retention of particolored or yellowish-tinged plumage at other seasons. The loss of a distinct winter plumage probably was synchronous with the loss of a post-nuptial molt. Adventitious renewals, necessitated out of season, may possibly stir into activity certain dormant faculties and result in the acquisition of some of the lost post-nuptial plumage which may then remain as part of the annual plumage. Examples of mixed coloration have been mentioned as showing casual replacements of the wrong color, though the reason for the phenomenon is in the realm of speculation. In any case the effect is curious and has been misleading to many writers who, almost without exception, have recorded particolored specimens as showing certain transition from immature to adult plumage, regardless of season. The full explanation must await intensive study in the field or in the aviary.

In the following discussion of the various races, the order of arrangement will be geographical, from south to north, beginning with the typical race. Descriptions will be detailed or comparative as occasion necessitates. Color terms when capitalized indicate direct comparison with Ridgway's "Color Standards and Color Nomenclature." Specimens are in Field Museum of Natural History unless otherwise noted.

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***Piranga flava flava* (Vieillot).**

"H(abia) amarilla" AZARA, Apunt., 1, p. 359, no. 87, 1802—Paraguay; ♀.

"H(abia) punzó" AZARA, Apunt., 1, p. 359, no. 88, 1802—Paraguay; ♂.

S(altator) Flavius VIEILLOT, Tabl. Ency. Méth., 2, p. 791, 1822—ex Azara, *Habia amarilla*; ♀.

S(altator) Ruber VIEILLOT (nec *Fringilla rubra* LINN.), Tabl. Ency. Méth., 2, p. 792, 1822—ex Azara, *Habia punzó*; ♂.

P(yranga) mississipensis LAFRESNAYE and D'ORBIGNY (nec *Tanagra mississipensis* GMELIN=*Piranga r. rubra*), Mag. Zool., 1837, cl. 2, p. 33—part, Paraguay; ex Azara.

Pyrranga Azarae D'ORBIGNY, Voy. Amér. Mérid., Ois., p. 264, 1839—part, Paraguay, Buenos Aires, and Yungas¹ and Valle Grande, Bolivia; ex Azara; descr. ♀, ♂; crit.: HARTLAUB, Index Azara, p. 6, 1847—nomencl.: RIDGWAY, Proc. Acad. Nat. Sci. Philad., June, 1869, p. 132—Paraguay (Capt. Page): FRENZEL, Journ. Orn., 39, p. 119, 1891—Córdoba, Argentina: HOLMBERG, Seg. Censo Rep. Argent., 1, (6), p. 543, 1895—Argentina; descr.: STEMPELMANN and SCHULZ, Bol. Acad. Nac. Cienc. Córdoba, 10, p. 399, 1890—Córdoba, Argentina.

P(yranga) azarae BONAPARTE, Consp. Av., 1, p. 241, 1850—Paraguay, Bolivia. *Tanagra Azarae* DOERING, Period. Zool., 1, p. 254, 1874—Río Guayquiraro, Argentina.

Pyrranga saira SCLATER (nec *Tanagra saira* SPIX), P. Z. S. London, 1856, p. 124—part, Paraguay and Buenos Ayres: BARROWS, Bull. Nutt. Orn. Cl., 8, p. 91, 1883—Concepción del Uruguay, Río Uruguay: SCLATER, Cat. Am. Birds, p. 80, 1862—part, synonym.

Pyrranga coccinea BURMEISTER (nec *Tanagra coccinea* BODDAERT=*P. r. rubra*), Journ. Orn., 8, p. 253, 1860—Paraná.

¹D'Orbigny's record from the "province" of Yungas is of uncertain allocation. It is not certain that he preserved a specimen from such a locality nor to what definite locality he referred. If he found a member of the group in the Yungas of La Paz it was almost certainly *lutea*; if in the Yungas of Cochabamba, it probably was *rosacea*; or it may have been typical *flava* from some other region south of the cordillera within some so-called province of Yungas.

P(yranga) coccinea BURMEISTER, Reise La Plata, 2, p. 479, 1861—Paraná, and "Banda Oriental"=Uruguay.

(*Pyrranga hepatica*) var. *azarae* RIDGWAY in BAIRD, BREWER, and RIDGWAY, Hist. N. A. Birds, 1, p. 434, 1874—Paraguay.

Pyrranga azarae SCLATER, P. Z. S. London, 1879, p. 601—part, Cinti, Bolivia (part): SALVIN, Ibis, 1880, p. 353—Tucumán, Argentina: WHITE, P. Z. S. London, 1883, p. 37—Cosquin and Córdoba, Argentina; migration and plumages: SCLATER, Cat. B. Brit. Mus., 11, p. 186, 1886—Uruguay; Córdoba, Salta, and Tucumán, Argentina; Cinti, Bolivia: WITHINGTON and SCLATER, Ibis, 1888, p. 462—Lomas de Zamora, Buenos Aires: SCLATER and HUDSON, Argent. Ornith., 1, p. 40, 1888—Argentina: SALVADORI, Boll. Mus. Torino, 10, no. 208, p. 4, 1895—Colonia Risso, n. Paraguay: KERR, Ibis, 1892, p. 124—Fortin Page, lower Pilcomayo R., Argentina: SALVADORI, Boll. Mus. Torino, 12, no. 292, p. 6, 1897—Aguaienda, s. e. Bolivia; San Francisco, San Lorenzo (Jujuy), and Tala (Salta), Argentina: BERTONI, Rev. Agron. Parag., 1, (9 and 10), p. 531, 1898—nest, eggs, food habits: GRANT, Ibis, 1911, p. 94—Colonia Mihanovitch and Santa Elena, n. Argentina.

Pyrranga flava KOSLOWSKY, Rev. Mus. La Plata, 6, p. 278, 1895—Chilecito, La Rioja, Argentina; plumages: LILLO, Anal. Mus. Nac. B. Aires, 8, p. 175, 1902—Tucumán: BAER, Ornith., 12, p. 215, 1904—Santa Ana, Tucumán: BRUCH, Rev. Mus. La Plata, 11, p. 257, 1904—Salta, Oran: LILLO, Rev. Letr. Cienc. Tucumán, 3, p. 41, 1905—Tucumán: GIACOMELLI, An. Soc. Cient. Argent., 63, p. 283, 1907—Rioja, Argentina: FONTANA, Sist. Av. Reg. Andina, p. 7, 1908—Catamarca, Argentina: BERLEPSCH, Ber. V Int. Orn.-Kongr., p. 1063, 1912—part, Paraguay, Uruguay, Argentina, Bolivia (Samaipata, Olgin, San José Misque): ARRIBÁLZAGA, Hornero, 2, p. 97, 1920—Chaco, Argentina.

Piranga flava KOSLOWSKY, Rev. Mus. La Plata, 6, p. 290, 1895—Catamarca, Argentina: DABBENE, Anal. Mus. Nac. B. Aires, 18, p. 376, 1910—Argentina: BERTONI, Faun. Parag., p. 62, 1914—Misiones, Argentina, and s. Paraguay: REED, Aves Prov. Mendoza, 1, p. 42, 1916—Mendoza oriental (errore): BERTONI, Hornero, 1, p. 190, 1918—Misiones, Argentina; descr. nest and eggs: idem, Anal. Cient. Par., 2, p. 246, 1918—Paraguay: TREMOLERAS, Hornero, 2, p. 23, 1920—Paysandu; Río Negro; Salto, Uruguay: SERIÉ and SMYTH, Hornero, 3, p. 53, 1923—Santa Elena (Entre Ríos), Argentina: PEREYRA, Hornero, 3, p. 174, 1923—San Isidro, prov. B. Aires, Argentina: WETMORE, Bull. U. S. Nat. Mus., 133, p. 392, 1926—Resistencia, Las Palmas, Riacho Pilaga, Formosa, and Tapia, Tucumán, Argentina; Puerto Pinasco, Paraguay; habits and plumages.

Piranga Azarae BERTONI, Av. Nuev. Parag., p. 198, 1901—Paraguay.

(*Pyrranga*) *azarae* DUBOIS, Syn. Av., 1, p. 658, 1902—Bolivia, Argentina, Paraguay, Uruguay: SHARPE, Hand-list, 5, p. 385, 1909—Bolivia, Argentina, Paraguay, Uruguay.

Piranga testacea LÖNNBERG (nec *Pyrranga testacea* SCLATER and SALVIN), Ibis, 1903, p. 471—Colonia Crevaux, s. e. Bolivia.

Piranga azarae HARTERT and VENTURI, Novit. Zool., 16, p. 171, 1909—Tapia and Tucumán, Argentina.

(*Piranga*) *flava* BRABOURNE and CHUBB, Birds S. Amer., 1, p. 418, 1903—Bolivia, Argentina, Uruguay, and Paraguay.

Diagnosis.—Most nearly approaching *rosacea* and *hepatica*. From *rosacea* the males differ only in the somewhat more reddish, less orange, tone of coloration and the wider and more extensive grayish edges of the dorsal feathers. From *hepatica* the males differ by their redder tone, slightly smaller size, redder (less grayish or whitish) ear-coverts, and less grayish edges on the feathers of the back; eyelids more conspicuously pink. The females differ from *hepatica* by their less grayish back, less yellowish forehead, brighter yellow eyelids, and more olivaceous (less grayish or whitish) ear-coverts.

Habitat.—Described originally from Paraguay and since found in Uruguay and over north-central Argentina from Buenos Aires and Concepción del Uruguay to Tucumán and Chilecito, Rioja. It inhabits eastern Bolivia up to and including the eastern part of the Sierra de Cochabamba. Northeastward of the Sierra de Cochabamba it is replaced by *rosacea*; westward it probably meets the range of *lutea* somewhere in northwestern Bolivia, between Cochabamba and Misque. Reed (1916) cites Burmeister as authority for the occurrence of the race in Mendoza, Argentina, but Burmeister (1861), on the contrary, states positively that it does not extend westward to Mendoza.

Description.—Males above dull Corinthian Red or Madder Brown x Pompeian Red, broadly margined from hind neck to lower back with gray which sometimes all but conceals the reddish subterminal areas of the feathers. Rump and upper tail-coverts brighter, with obsolete paler edges. Crown bright Pompeian Red x Nopal Red or Jasper Red x Nopal Red, pinker just above the lores. Under parts Rose Doree x Coral Red; sides and flanks washed with gray. Auriculars about like crown, slightly streaked with whitish shaft lines; lores dusky; eyelids pale, pinkish. Wing 91-98 mm. (av. 95.6); tail 72-82 (av. 76.7); exposed culmen 16-18 (av. 16.9); culmen from base 20-22 (av. 21.4); tarsus 19-21.5 (av. 20.5).

Females grayish above, between Citrine-Drab and Yellowish Olive. Below dark Amber Yellow, olivaceous on sides and flanks. Forehead and crown more yellowish than the back; lores grayish white with bright yellow upper border; eyelids pale yellow; auriculars like back. Wing 90-92.5 mm. (av. 91.3); tail 72-81 (av. 76.4); exposed culmen 15-17 (av. 16); culmen from base 21-21.5 (av. 21.2); tarsus 21-22 (av. 21.5).

Remarks.—This race is distinguishable from all other forms occurring in South America by the heavy grayish edges on the feathers of the dorsal surface which conceal the subterminal red (or olive) to a degree depending on the amount of abrasion. The same character is present to a lesser degree in *rosacea* but occurs even more pronouncedly at the far northern end of the specific range, in *dextra* and *hepatica*, where it is accompanied by other distinguishing features. In fact, the resemblance of *flava* and *dextra* is so pronounced that it seems probable that these two forms represent the nearest approach to the ancestral type which has remained most constant at the extremities of the range and reached its highest degree of modification somewhere in the intervening region.

There is a certain amount of variability exhibited by specimens of the present race. Some are much deeper red (less rosy) than others. A male from Río Vermejo, Salta, Argentina, is only narrowly margined with grayish above and resembles some examples of *rosacea* in this particular. Another male from Embarcación, Orán, Argentina, is about the hue of *rosacea* below while above it is like typical *flava*. A male in the British Museum from San José Misque (examined for me by Dr. Hellmayr) also resembles *rosacea* below; otherwise it is exactly like a male from Uruguay. A single male collected by Barrows at Concepción del Uruguay, August 30, 1880, is quite pale below and may possibly indicate some such transition to *saira* of Brazil as occurs through *rosacea* in Bolivia, but it is badly worn and much of its pale coloration seems to be due to fading; the tone of red is still that of *flava*, not that of *saira*.

The seasonal development of *flava* may be determined provisionally from Bertoni's (1918) record of nest and eggs in October at Misiones. Given a breeding season in October, the annual molt should commence about the end of December or the first of January and be complete in early April. Wetmore (1926) records a young male from Tapia, Tucumán on April 9, just completing its molt from worn yellowish green to adult red. The most perfectly plumaged adult male which I have seen was collected on April 28 at Vipos, Tucumán, evidently after the completion of the molt. Examples taken between April and December show various degrees of wear and a specimen from Macho Muerto, Orán, Argentina, collected December 20, is quite badly worn, pale and dull, probably ready to commence its molt.

Wetmore gives the call note of *flava* as a not loud 'chip' or 'chu' and describes the flight as undulatory. Bertoni (1898) describes

the nest as being built of grass and leaves, lined with horsehair, in which were placed three eggs, white, speckled with cinnamon; the nest was built in a thicket. Barrows says that he observed the birds at Concepción only in the early spring and that they gave no evidences of breeding, being silent, sluggish, and not very wary.

Specimens examined.—Argentina: Tucumán, Vipos 1 ♂; Concepción 2 ♂ 2 ♀; Salta, Río Vermejo 2 ♂ 2 ♀¹; Orán, Embarcación 1 ♂¹; Macho Muerto 1 ♂¹; Concepción del Uruguay 1 ♂². Bolivia: Cordillera, Guanacos 3 ♂¹; Pampas de Taperas (near Santa Cruz) 1 ♂¹.

Piranga flava rosacea Todd.

P(yranga) mississipensis LAFRESNAYE and D'ORBIGNY (nec *Tanagra mississipensis* GMELIN=*Piranga rubra*), Mag. Zool., 1837, cl. 2, p. 33—part, Chiquitos, Bolivia.

Pyranga Azarae D'ORBIGNY, Voy. Amér. Mérid., Ois., p. 264, 1839—part, Chiquitos, Bolivia.

Pyranga saira SCLATER (nec *Tanagra saira* SPIX), P. Z. S. London, 1856, p. 124—part, Bolivia (part).

Pyranga azarae SCLATER (nec D'ORBIGNY), P. Z. S. London, 1879, p. 601—part, Chiquitos, Bolivia.

Piranga saira rosacea TODD, Proc. Biol. Soc. Wash., 35, p. 92, 1922—Palmarito, Río San Julian, Chiquitos, Bolivia; orig. descr.; type Car. Mus. examined.

Piranga saira saira TODD (nec *Tanagra saira* SPIX), Proc. Biol. Soc. Wash., 35, p. 92, 1922—part, Río Quiser, Velasco, Bolivia.

Piranga flava azarae HELLMAYR (nec *Pyranga azarae* D'ORBIGNY), Novit. Zool., 30, p. 241, 1923—Chiquitos, Bolivia; crit.

Diagnosis.—Males differ from those of *flava* by being more scarlet and less true red in coloration, being also less broadly margined with gray on the back. From *saira* they differ by reason of these grayish margins which are present, though narrow, in *rosacea* and absent in *saira*. From *lutea* the males differ by the presence of the gray margins and also by the different tone of red which is here duller and more orange. Females are less grayish than *flava*, paler than *lutea*, and nearest *saira* in tone of olive and yellow though grayer above.

Habitat.—Northeastern Bolivia, from Santa Cruz to the neighborhood of the Brazilian (Matto Grosso) boundary; northeast of the Sierra de Cochabamba.

¹Specimens in Carnegie Museum, Pittsburgh.

²Specimens in Museum of Comparative Zoology, Cambridge.

Description.—Males above vary from Vinaceous-Rufous to Dragons-blood Red x Brick Red (in the type) and Dragons-blood Red x Pompeian Red, with moderately narrow but distinct edges of gray on the back; rump and upper tail-coverts brighter, clearer. Crown brighter, Scarlet x Coral Red in the palest example, Scarlet x Dragons-blood Red in the type, and clear Dragons-blood Red in dark Río Quiser specimens. Lores grayish white; auriculars like hind neck, plain or faintly streaked with whitish. Below almost Grenadine Red in the type, Apricot Orange x Orange Chrome in the palest example, almost Scarlet-Red x Scarlet in dark specimens; flanks a little duller, washed with grayish. Wing 92-100 mm. (av. 96.2); tail 69.5-77 (av. 72.3); exposed culmen 16-17 (av. 16.4); culmen from base 21-22 (av. 21.3); tarsus 21-22 (av. 21.2).

Females above Yellowish Citrine or Light Yellowish Olive, with grayish edges on the interscapular feathers. Below Primuline Yellow to Wax Yellow x Amber Yellow, deeper on middle of chest which is sometimes deep Light Cadmium; flanks grayish or olivaceous. Wing 93-97.5 mm. (av. 94.5); tail 71-75 (av. 72.7); exposed culmen 16-17 (av. 16.5); culmen from base 21-21.5 (av. 21.2); tarsus 20-22.5 (av. 21).

Remarks.—The nomenclature of this race is involved in a tangle which requires some discussion. D'Orbigny (1839), in proposing the name *azarae*, gave a list of synonyms headed by Azara's "Habia punzó" and including Vieillot's *Saltator flavus*. He carefully explained his well-founded reasons for rejecting Vieillot's *Saltator ruber* (pre-occupied) and Lichtenstein's *Tanagra mississipensis* (a distinct form), but he ignored the name *flavus*, aside from placing it in synonymy, without giving any reasons for such rejection; probably it was because of its foundation on a female and consequent inapplicability to the red males. He then proposed to rename the species under discussion *in honor of the first author to give a good description of it*, and applied the new name *azarae* in consequence.

In his discussion of distribution, D'Orbigny recorded an occurrence of the species from near Buenos Aires (erroneously regarding it as accidental), mentioned Azara's records from Paraguay, and stated that he, himself, had taken specimens also in the provinces of Chiquitos, Yungas, and Valle Grande, Bolivia. He gave the range of the species as lying on the eastern side of the Andes, from 15 to 34 degrees s. latitude. No attempt was made to separate the Bolivian birds as new, no type locality was given, and no type was designated.

It is apparent that the name *azarae* was proposed for Azara's two Paraguayan birds which Lafresnaye and D'Orbigny had already united in a single species under erroneous determination as *missisipensis* Lichtenstein and recorded from Chiquitos, as mentioned in D'Orbigny's synonymy. Nevertheless, D'Orbigny's Chiquitos specimens are still in the Paris Museum and one of them is marked as the type of his *azarae* (Hellmayr, Novit. Zool., 30, p. 241, 1923). This specimen should not affect the status of the name *azarae* in view of the fact that the name was proposed as a new one for a species whose type locality already was Paraguay. The reference of Chiquitos specimens to this form was in error (in view of later discoveries), and the selection of one of them as a type was unjustifiable.

In 1922, Todd described his *rosacea* as a race of *saira* from Chiquitos. Hellmayr (1923) noted that D'Orbigny's Chiquitos specimens were different from his Buenos Aires specimen and from a Chaco male and used the name *azarae* for the Bolivian examples in the belief that it had been proposed as a new name for *missisipensis* Lafresnaye and D'Orbigny instead of for Azara's two birds. Recently he has kindly compared a paratype of *rosacea* with D'Orbigny's Chiquitos birds and informs me that they are identical. Therefore, if the name *azarae* were not a synonym of *flava* it would have priority over *rosacea*.

In describing *rosacea*, Todd compared it to north-Bolivian examples from the Río Quiser, province of Velasco (adjoining Chiquitos on the north), which he identified as *saira* and from which he separated the new race by its rather paler coloration. The proximity of Chiquitos to the Río Quiser on the north and to the Pampas de Tapera and Guanacos, Cordillera (where *flava* occurs) on the south, would leave *rosacea* under this arrangement with an extremely restricted range. However, the Río Quiser birds do not compare satisfactorily with Brazilian examples of *saira* from Matto Grosso, Maranhão, São Marcello, and Goyaz (12 ♂ and 6 ♀), but appear to be much closer to *rosacea*, from which they differ only by being a little darker in hue. Curiously enough, they are closer to *flava* in appearance and size than are the type and paratypes of *rosacea*. In any case the examples from the Río Quiser and Chiquitos together differ from typical Brazilian *saira* by having distinct grayish edges on the dorsal feathers while *saira* is clear red above without grayish margins. From *flava* this combined series differs by having the gray margins narrower and the general color more scarlet and less red.

Thus, if we extend the limits of *rosacea* to include all Bolivian birds found north and northeast of Santa Cruz to the borders of Matto Grosso, Brazil, we shall have a homogeneous and fairly well-marked race exactly intermediate between *saira* and *flava* geographically and taxonomically although of still quite limited distribution.

The type series from Chiquitos exhibits noticeable variability. The type is the darkest of all but is paler below than any specimen examined of the light-colored *macconnelli*. One of the paratypes is much paler and two other males are intermediate. In the series from the Río Quiser, one male has the head only slighter brighter than the back, showing an approach toward *lutea*. Another from Palmarito, Chiquitos shows a slight tendency in the same direction. Females also exhibit variability in the extent of the grayish dorsal margins and in the tone of yellow.

Plumages and molts appear to be about as in *flava*. The Chiquitos birds were taken in May and are mostly full-plumaged. The three pale specimens have a few scattered feathers of a deeper red than the rest of the plumage which may indicate some abnormality in the unusually pale coloration. One bird is acquiring some slightly deeper red feathers on the throat and middle of the crown while several occipital feathers are quite pale and worn, but the rest of the plumage is not especially abraded. This skin possibly may exhibit the completion of the annual molt.

The Río Quiser birds were taken early in June. One is in fresh plumage with no signs of molt; one has a few pale, abraded feathers on the lower breast; a third has a few feathers on the mantle somewhat fresher in appearance than the remainder. None of the specimens show evidence of regular molt.

Little is recorded about the habits of this race. D'Orbigny's statements concerning his *azarae* may refer to his Buenos Aires specimen of *flava* but probably are intended also for the individuals found at Chiquitos. He says that the birds frequented the tops of tall shrubs and low trees and were noisy and constantly in motion.

Specimens examined.—Bolivia: Palmarito, Río San Julian, Chiquitos 4 ♂ (incl. type) 3 ♀¹; Río Quiser, Velasco 3 ♂ 3 ♀¹.

***Piranga flava saira* (Spix).**

Tanagra mississippiensis LICHTENSTEIN (nec GMELIN=*P. r. rubra*), Verz. Doubl. Berl. Mus., p. 30, 1820—São Paulo; ♂.

¹Specimens in Carnegie Museum, Pittsburgh.

Tanagra misissipensis (sic) LICHTENSTEIN, l.c.—no loc.; ♀.

Tanagra saira SPIX, Av. Bras., 2, p. 35, pl. 48, fig. 1, 1825—"m(as)" (= ♀) and ♀; no loc. (subst. type loc. Rio, Berlepsch, 1908; subst. Caxias, Piauh, Hellmayr, 1929); type Munich Mus.

Tanagra Mississipiensis LESSON, Traité d'Orn., p. 465, 1831—Brésil; ♀.

Ph(oenicosoma) Azarae CABANIS (nec *Pyranga Azarae* D'ORBIGNY), Mus. Hein., 1, p. 25, 1850—Brasilien.

Pyranga saira SCLATER, P. Z. S. London, 1856, p. 124—part, Brazil [Rio, Bahia, Minas, and S. Paolo (sic)]: idem, Cat. Am. Birds, p. 80, 1862—part, Rio de Janeiro: RIDGWAY, Proc. Acad. Nat. Sci. Philad., June, 1869, p. 131—Brazil: REINHARDT, Vidensk. Med. Naturh. Foren. Kjob., 1870, p. 429—Barbacena, Sete Lagoas, Curvelo, and Paracatú, Minas Geraes; Campinas and Rio Grande de Paraná, São Paulo: BERLEPSCH and IHERING, Zeitschr. Ges. Ornith., 2, p. 120, 1885—Linha Pirajá (=Neu Petropolis, Rio Grande do Sul): SCLATER, Cat. B. Brit. Mus., 11, p. 185, 1886—Brazil; Bahia, Pelotas, and Rio (trade skin?): IHERING, Ann. Estado Rio Grande do Sul, 16, p. 119, 1899—Mundo Novo, Brazil: idem, Rev. Mus. Paul., 3, p. 151, 1899—Estdo. S. Paulo: RIBEIRO, Arch. Mus. Nac. Rio Jan., 13, p. 186, 1905—Caminho do Couto, Serra do Itatiaya: BERLEPSCH, Ber. V Int. Orn.-Kongr., p. 1063, 1912—Monte Alegre; Bahia; Rio (ex Sclater?); Ytarare and Ypanema, S. Paulo; Linha Pirajá; Goyaz, Cuyaba, and Chapada, Matto Grosso: SNETHLAGE, Journ. Orn., 61, pp. 484, 920, 1913—Serra do Ereré and Monte Alegre; ecol.: idem. Bol. Mus. Goeldi, 8, p. 449, 1914—Monte Alegre, Serra do Ereré, n. Amazonas, Maranhão: REISER, Denk. Kais. Akad. Wiss. Wien, Math.-Naturw. Kl., 76, p. 185, 1925—Bandeira and Fazenda Riachoela: H. SNETHLAGE, Journ. Orn., 76, p. 535, 1928—Brazil; ecol.

Pyranga coccinea BURMEISTER (nec *Tanagra coccinea* BODDAERT=*P. r. rubra*), Syst. Ueb. Thiere Bras., 3, p. 171, 1856—Minas Geraes.

Pyranga Saira PELZELN, Orn. Bras., pp. 211, 371, 435, XLVII, 1871—Ypanema, Campo pantoso, Ytararé, Jaguaraiaba, Porcos de Riva, Curytiba, Pitangui, Paraná, Jose Dias, Goiaz, Ponte alto, Cuyaba, S. Paulo, Bahia, Minas; ecol.

(*Pyranga hepatica*) var. *saira* RIDGWAY in BAIRD, BREWER, and RIDGWAY, Hist. N. A. Birds, 1, p. 434, 1874—Brazil.

(*Phoenicosoma*) *saira* HEINE and REICHENOW, Nomencl. Mus. Hein., p. 17, 1890—part, Brasilien.

Piranga saira ALLEN, Bull. Am. Mus. Nat. Hist., 3, p. 357, 1891—Chapada, Matto Grosso; plumages, molts, and breeding: HELLMAYR, Abh. K. Bay. Akad. Wiss., 2 Kl., 22, p. 670, 1906—s. Brazil; crit.: CHROSTOWSKI, Compt. Rend. Soc. Scient. Varsov., 5, pp. 487, 499, 1912—Vera Guarany, Paraná: RIBEIRO, Arch. Mus. Nac. Rio Jan., 24, p. 255, 1923—Retiro de Ramos, Serra do Itatiaya.

(*Pyranga*) *saira* DUBOIS, Syn. Av., 1, p. 658, 1902—Brésil, e. and s.: SHARPE, Hand-list, 5, p. 385, 1909—e. Brazil.

(*Piranga*) *saira* IHERING and IHERING, Cat. Faun. Bras., 1, p. 359, 1907—S. Paulo (Batataes, Campos de Jordão, Franca, Itararé): Matto Grosso

(Porto da Faya): BRABOURNE and CHUBB, Birds S. Amer., 1, p. 418—part, e. and c. Brazil.

?(*Piranga saira*) BERLEPSCH, Novit. Zool., 15, p. 116, 1908—part; subst. type loc. Rio.

Pryanga (sic) *saira* REISER, Denk. Kais. Akad. Wiss. Wien, Math.-Naturw. Kl., 76, p. 85, 1910—S. Ant. de Gilboëz, Bandeira, S. Maria, S. Philomena, Faz. Riachoëlo, Piauhý.

P(yranga) saira HELLMAYR, Novit. Zool., 30, p. 24, 1923—w. Minas (Bagagem), Goyaz, Lower Amazonas (Serra do Ereré and Monte Alegre); crit.

Piranga saira saira HOLT, Bull. Am. Mus. Nat. Hist., 57, pp. 262, 321, 1928—Serra do Itatiaya (ex Ribeiro).

Piranga flava saira HELLMAYR, Field Mus. Nat. Hist. Publ., Zool. Ser., 14, pt. 8, p. 282, 1929—Maranhão (Codo, Cocos; Tranqueira; Fazenda Inhuma, Alto Parnahyba) and Goyaz (Philadelphia); subst. type loc. Caxias, Piauhý.

Diagnosis.—Males separable from *lutea* by brighter coloration, especially of the crown; from *rosacea* by somewhat purer red without grayish tips on the back; from *macconnelli* by rather deeper coloration. Females clearer than *lutea*, deeper than *macconnelli*, and without the grayish dorsal margins of *flava* or *rosacea*.

Habitat.—Campos regions of Brazil except at the extreme northern boundary.

Description.—Males above dark Brazil Red x Nopal Red to dark English Red; whole crown, especially forehead, brighter, Nopal Red x Scarlet to Scarlet, sometimes with an ill-defined superciliary line above lores to posterior border of the orbit. Lores dull whitish, tinged with red; auriculars like crown with whitish shaft lines not strongly developed; eyelids paler, pink. Whole under parts clear Scarlet-Red x Scarlet to Scarlet; flanks a trifle duller. Wing 89-98 mm. (av. 95.4); tail 71-79 (av. 74.1); exposed culmen 17-20 (av. 18.4); culmen from base 22-24 (av. 23.8); tarsus 19-23 (av. 21.5).

Females above Yellowish Citrine, brighter on the crown and forehead; sides of forehead above lores about Primuline Yellow, extending backward over eyes in a poorly defined superciliary. Lores soiled yellowish; auriculars like hind neck with poorly pronounced yellowish shaft lines; eyelids pale yellow. Whole under parts Primuline Yellow to Primuline Yellow x Wax Yellow; flanks more olivaceous. Wings 87-97 mm. (av. 91.8); tail 67-78 (av. 72.7); exposed culmen 18-19 (av. 18.5); culmen from base 22-23 (av. 22.2); tarsus 21-23 (av. 21.9).

“Young in first plumage are greenish gray above, narrowly streaked with dusky; below pale yellowish white, more broadly streaked with dusky” (Allen, 1891).

Remarks.—This race is distributed over most of Brazil in such portions as present suitable open areas in which there is a scattered growth of trees and bushes. In heavily forested localities the bird does not occur, and this precludes its existence in the upper Amazonian region which is almost exclusively of that nature. It ranges intermittently from São Paulo to Bahia, Rio Grande do Sul, Matto Grosso, Maranhão, and western Para where it crosses the Amazon to Monte Alegre and Serra do Ereré. The only record from Rio de Janeiro is questionable, being based on a trade skin of doubtful origin in the Sclater collection in the British Museum. The country about Rio, being heavily forested, is unsuitable for the species in any case, although clearance of the forest may allow the bird to become established there at some future time. Berlepsch was unjustified in suggesting Rio for the type locality of this race both for the above reason and because Spix is not known to have visited Rio and had no specimens from that region when he drew up his description of *saira*. Hellmayr's substitution of Caxias, Piauí, is much preferable. The nearest approach to Rio in other published records is in Ribeiro's accounts from Caminho de Couta and Retiro de Ramos, Serra do Itatiaya.

A female from Santarém, in Field Museum of Natural History, is quite definitely referable to *saira*, and a male from Serra do Ereré (ex Mus. Goeldi), across the Amazon northward, has been examined by Hellmayr who pronounces it likewise unquestionably *saira*. Evidently the Amazon is not a racial boundary in the present instance.

Berlepsch and Ihering (1885) record a specimen of *saira* from Linha Pirajá, Rio Grande do Sul, which Berlepsch later (1912) described as larger and darker rose-red than examples from São Paulo, Matto Grosso, and Bahia, with wing 104 mm. and tail 84.5. In Berlepsch's manuscript notes another male is mentioned from Pelotas with wing 101 mm. and tail 83.5. No mention is made of any grayish dorsal margins in either example so that both are probably typical *saira* in coloration, although the unusually large measurements seem to indicate an approach toward *flava* which has been recorded from Uruguay immediately to the southward.

There is a certain amount of variation among the adult red males which tends to approach the characters of other adjacent forms.

Thus, a male from Codó, Cocos, Maranhão, is unusually pale and orange-tinted so as to be practically indistinguishable from certain examples of *macconnelli*, although it must be referred to *saira* because of its locality. It probably represents the extreme limit of variation in this direction. A male from Inhumas, Alto Parnahyba, Maranhão, is the darkest of the series and has less contrast than usual between the color of the back and that of the crown, showing an approach toward *lutea*. Matto Grosso males are closer to *rosacea* than are specimens from eastern Brazil, as would be expected from the proximity of the ranges.

Allen (1891) gives an interesting study of plumages and molts in Matto Grosso birds which, in its principal features, shows a close adherence to the rules demonstrated for *flava* and *rosacea*, although the chronology is slightly altered. According to Allen's conclusions, young birds in November and December molt into the plumage of the female and, at the following molt, the first year males acquire a variable proportion of adult male dress. Adult male plumage is not acquired by a single molt since males in September may have red, olive, or particolored livery. Adult males do not resume female plumage since some examples, in January, are molting from worn, faded red into fresher, brighter red.

In general this accords well with facts secured from other sources. In the series at hand the molt appears to have begun in November and to have ended late in March, although one July bird and one September specimen show considerable renewal of parts of the plumage which other examples taken in the same months do not show. The molting specimen taken in September, in Matto Grosso, is acquiring many new yellow feathers to replace worn red ones, but these renewals are irregular and probably represent accidental loss and replacement.

One November specimen from Tranqueira, Maranhão, sexed by the collector as a male, is in olive plumage molting into a deeper, more orange hue of the same color; the worn plumage is of full texture and does not suggest immaturity. A March bird from São Marcello is nearly all fresh red with a few old, worn, yellow feathers remaining on the breast. An April example from Matto Grosso, sexed as a male, is in perfectly fresh yellow plumage.

Specimens examined.—Brazil: São Marcello 1 ♂; Inhumas, Maranhão 1 ♂ 1 ♀; Codó, Cocos, Maranhão 1 ♂ 1 ♀; Tranqueira,

Maranhão 1 ♂; Philadelphia, Goyaz 1 ♂; Santarem 1 ♀; Chapada, Matto Grosso 7 ♂ 3 ♀¹.

Piranga flava macconnelli Chubb.

?*Pyrranga azarae* (*Fanagra saira*?) (sic) BONAPARTE (nec D'ORBIGNY), Bull. Soc. Linn. Normandie, 2, p. 31, 1857—Cayenne (coll. Deplanches); ♂.

"?(*Piranga saira* - - - = *P. haemalea*?)" BERLEPSCH, Novit. Zool., 15, p. 116, 1908—Cayenne (ex Bonaparte).

(*Piranga*) *saira* BRABOURNE and CHUBB (nec *Tanagra saira* SPIX), Birds S. Amer., 1, p. 418, 1912—part. Brit. Guiana (part).

Piranga saira macconnelli CHUBB, Ann. Mag. Nat. Hist., (9), 8, p. 446, 1921—Upper Takutu Mts., Brit. Guiana: idem, Birds Brit. Guiana, 2, p. 524, pl. 9, 1921—Upper Takutu Mts. and Quonga, Brit. Guiana.

Diagnosis.—Nearest to *saira* from which it is separable by an average of lighter coloration in both sexes.

Habitat.—Savanna country from the Takutu Mountains, British Guiana to the upper Rio Branco, Brazil; possibly similar country in Surinam and French Guiana.

Description.—Males with back Brazil Red x English Red to dark English Red; rump and upper tail-coverts clearer; top of head brighter, Scarlet to Grenadine Red, brightest above lores and on a poorly marked superciliary stripe. Lores soiled whitish; auriculars a little paler than crown with indistinct whitish shaft lines; eyelids possibly slightly paler, pink. Chin, throat, and rest of under parts Scarlet, faintly tinged with Scarlet-Red, to pale Scarlet x Grenadine Red; flanks a trifle duller. Wing 94-99 mm. (av. 96.3); tail 76-83 (av. 77.9); exposed culmen 19-19.5 (av. 19.2); culmen from base 22-23 (av. 22.3); tarsus 21-22 (av. 21.5).

Females with back Pyrite Yellow; upper tail-coverts paler; crown and nape Sulphine Yellow; forehead brighter, approaching Primuline Yellow, a little deeper laterally above lores and along a moderately well-defined superciliary; eyelids paler yellow. Lores dusky yellowish white; auriculars like nape, with paler yellow shaft streaks. Under parts Lemon Yellow tinged with Wax Yellow; flanks a little grayer. Wing 91-93 mm. (av. 92); tail 73-76 (av. 74); exposed culmen 18.5-19 (av. 18.8); culmen from base 22-22.5 (av. 22.2); tarsus 21.5-22 (av. 21.8).

Remarks.—This race is not very well marked since the darkest example at hand is a trifle darker than the lightest *saira* (an unusually

¹Specimens in American Museum of Natural History, New York.

pale example from Codó, Cocos, Maranhão, which is mentioned under *saira*). Averages, however, are separable and extremes of both sexes are noticeably distinct. The form, therefore, may be allowed to stand.

Dr. Hellmayr has been kind enough to examine for me the type and other specimens of this form in the British Museum, including three males and one female from Quonga, one female from Annai, and the type from the upper Takutu Mountains. These specimens appear to be quite similar to the series in Field Museum of Natural History listed below. A young male from Quonga, taken November 1, has orange-red feathers on forehead, throat, and chest intermixed with the yellow plumage of the under side, which is brighter than in the Annai female.

In the series at hand, a male from Serra da Lua, taken March 26, is in process of molt and has the two central rectrices and one tertial on each wing newly acquired but with distinctly yellowish terminal portions; a few new feathers on the forehead and lores are red, replacing old, orange-tinted ones, and several new interscapulars are olive; most of the plumage is badly worn and faded red.

A December male from Bõa Vista has several new rectrices, all on the left wing and all yellowish toward their tips; the adjacent red quills are not badly worn.

A November male from Quonga shows molt beginning on the forehead, red replacing red.

Bonaparte's record of a male specimen obtained by Deplanches in Cayenne, which he appears to be unable to identify with precision, may belong to the present race. Berlepsch tentatively suggests *haemalea* as the probable identification, but the bird is more likely to be *macconnelli* (or *saira* as suggested by Bonaparte) if it came from any part of French Guiana visited by Deplanches, apparently only the immediate neighborhood of Cayenne. There are no other records from that region, which is very heavily forested and unsuitable as a habitat of the species, so that it is doubtful if the specimen was actually secured at that locality. If the specimen is still in existence in the Museum of Caen, where it was deposited, its identity might be ascertained.

Although the range of *macconnelli* adjoins that of *haemalea* on the north, the relationship to that form appears to be not directly but through the forms occupying Bolivia, Perú, Ecuador, Colombia,

and Venezuela. This is of especial importance in view of the fact that *haemalea* has been taken at Quonga where *macconnelli* also occurs. It will be discussed in greater detail under *haemalea*. Meanwhile the connective forms of the Andean territory will be taken up in their order.

Specimens examined.—British Guiana: Quonga 1 ♂. Brazil: Serra da Lua 1 ♂ 1 ♀; Bõa Vista 1 ♂ 2 ♀.

***Piranga flava lutea* (Lesson).**

Pithylus luteus LESSON, l'Inst., 2, no. 72, p. 317, 1834—Callao, Perú; ♀.

Pitylus luteus LESSON, Journ. Nav. Thétis et Espér., 2, p. 326, 1837—Callao.

Phoenisoma Azarae TSCHUDI (nec *Pyranga Azarae* D'ORBIGNY), Arch. Naturg., 10, (1), p. 287, 1844—Perú.

Ph(oenisoma) Azarae TSCHUDI, Faun. Per., Aves, p. 207, 1846—Perú.

Phoenisoma lutea LESSON, Oevr. Compl. de Buffon, ed. Lévêque, 20 (=Descr. Mamm. et Ois.), p. 346, 1847—Callao, Perú; descr. ♀.

Pyranga saira SCLATER (nec *Tanagra saira* SPIX), P. Z. S. London, 1856, p. 124—part, e. Perú.

Pyranga azarae TACZANOWSKI (nec *Pyranga Azarae* D'ORBIGNY), P. Z. S. London, 1874, p. 514—Junin, Perú: idem, op. cit., 1877, p. 332—Palmas, Ecuador: idem, op. cit., 1879, p. 227—Tambillo, Perú; crit.: SCLATER, P. Z. S. London, 1879, p. 601—part, Cangalli and Cinti (part), Bolivia: TACZANOWSKI, P. Z. S. London, 1880, p. 195—Callacate, Perú: idem, op. cit., 1882, p. 14—Chirimoto, Perú.

Pyranga testacea SALVIN and GODMAN (nec SCLATER and SALVIN), Biol. Cent. Amer., Aves, 1, p. 292, 1883—part, Ecuador, Bolivia: SCLATER, Cat. B. Brit. Mus., 11, p. 184, 1886—part, Jima, Ecuador (?); Chirimoto, Perú; Cinti and Cangalli, Bolivia.

Pyranga Azarae TACZANOWSKI (nec D'ORBIGNY), Orn. Pér., 2, p. 495, 1884—Junin, Tambillo, Callacate, Chirimoto, Lechugal, and Nancho, Perú; descr.

Pithylus puteus TACZANOWSKI, Orn. Pér., 3, p. 513, 1886—Callao.

P(yranga), Azarae TACZANOWSKI, Orn. Pér., Tabl., p. 79, 1886—diag.

(*Phoenicosoma*) *saira* HEINE and REICHENOW (nec *Tanagra saira* SPIX), Nomencl. Mus. Hein., p. 17, 1890—part, Perú.

Pyranga testacea tschudii BERLEPSCH and STOLZMANN, P. Z. S. Lond., 1892, p. 375—Lima; orig. descr.: idem, op. cit., 1896, p. 345—La Merced, Perú: idem, Orn. 13, pp. 82, 111, 1906—Santa Ana and Huaynapata, Perú: BERLEPSCH, Ber. V Int. Orn.-Kongr., p. 1064, 1912—Songo, Quebrada Onda, Cangalli, and Cinti, Bolivia; Santa Ana, Huaynapata, Marcapata, La Merced, Chanchamayo, Junin, Tambillo, Callacate, Chirimoto, Cajabamba, Guayabamba, Suecha, Viña, Lima, and Lechugal, Perú: BANGS and NOBLE, Auk, 35, p. 461, 1918—Tabaconas and Huancabamba, Perú: CHAPMAN, Bull. U. S. Nat. Mus., 117, p. 121, 1921—Chauillay and Río

Comerciato, Perú: idem, Bull. Amer. Mus. Nat. Hist., 55, p. 677, 1926—Esmeraldas, La Puente, Portovelo, Zaruma, Punta Santa Ana, Casanga, Salvias, Lunamá, Alamor, Pullango, Cebollal, and Celica, Ecuador.

P(yranga) testacea putea BERLEPSCH and STOLZMANN, P. Z. S. London, 1892, p. 375, footn.

Pyranga tschudii SALVIN, Novit. Zool., 2, p. 5, 1895—Cajabamba, Chusgon, and Suecha, Perú.

(*Pyranga testacea*) Var. *Tschudii* DUBOIS, Syn. Av., 1, p. 658, 1902—Pérou.

Piranga testacea testacea RIDGWAY, Bull. U. S. Nat. Mus., 50, pt. 2, p. 86, 1902—part (Perú and Bolivia ?).

(*Pyranga*) *tschudii* SHARPE, Hand-list, 5, p. 385, 1909—c. Perú and Bolivia.

(*Pyranga*) *testacea* SHARPE, Hand-list, 5, p. 384, 1909—part, Ecuador.

(*Piranga*) *tschudii* BRABOURNE and CHUBB, Birds S. Amer., 1, p. 419, 1912—Perú, Bolivia.

Diagnosis.—More deeply colored than any other South American race except *desidiosa* and *haemalea*; clearer and deeper than *testacea*; darker and duller than *faceta*.

Habitat.—Perú, northwestern Bolivia, and Ecuador, in suitable territory.

Description.—Males with upper parts averaging Nopal Red x Garnet Brown (sometimes approaching Ox-blood Red); sides of forehead over the lores brighter, about Nopal Red; top of head a trifle brighter than the back. Lores dusky or dull whitish mixed with gray and more or less tipped with red; auriculars about like back with somewhat distinct white shaft lines; eyelids pale, Geranium Pink x Strawberry Pink. Below Scarlet-Red, lightly tinged with Spectrum Red on throat; breast near Nopal Red. Wing 88-98 mm. (av. 91.6); tail 71-84 (av. 76.6); exposed culmen 16-18 (av. 16.2); culmen from base 20-23 (av. 21.6); tarsus 20-22 (av. 20.7).

Females dull Citrine above, brighter on the head. Below Wax Yellow, more olivaceous on the flanks. Eyelids pale yellowish in contrast to the sides of face, Straw Yellow x Amber Yellow. Wing 84-91 mm. (av. 86.8); tail 73-79 (av. 75.6); exposed culmen 16-18 (av. 16.8); culmen from base 21-22 (av. 21.4); tarsus 19-22 (av. 20.7).

Remarks.—Berlepsch and Stolzmann in describing *tschudii* suggested the possibility that "*putea*" (= *lutea*) of Lesson might be the female of the same form. There is little doubt that this surmise is correct. Lesson's description is fairly exact and there is no other bird of the region of Callao to which it can apply. The fact that Lesson later placed the species in the genus *Phoenisoma* (the type of which is *Piranga rubra*) further substantiates the identification.

Lesson discusses *lutea* in his report on the birds collected during the years 1824 to 1826 on the voyage of the *Thétis* and *Espérance*, but there is no evidence that this voyage touched at Callao, the type locality of the race. He similarly treats *Pyrgita peruviansis* in the account of the voyage whereas in the original description in *l'Institut*, he says that it was collected in 1831. Presumably the type of *Pithylus luteus* had an origin other than the voyage of the *Thétis* and *Espérance*.

Nation did not find this species at Lima but Kalinowski collected two specimens there in 1899, one of which is the type of Berlepsch and Stolzmann's *tschudii*. I obtained it at Santa Eulalia a short distance inland from Callao. It is found throughout the subtropical zone of Perú and extends its range into the arid tropical as at Lima and Santa Eulalia where it frequents the lightly wooded valleys of the Río Rimac and its tributaries. It is recorded from La Merced, Chanchamayo Valley, which is humid tropical, although the single specimen from that locality (a young male taken in October) may have been secured on some of the immediately adjacent subtropical hillsides; I did not find the bird at La Merced. Chapman (1921) catalogues the race as an arid tropical form in the Urubamba region although he records one specimen from Río Comerciato which he calls humid tropical. The bird is not a regular inhabitant of the humid tropical zone, however, and is noticeably absent from all collections made in the lowland forests of northern Perú.

The distribution in Bolivia is somewhat problematical. In a report on Buckley's Bolivian collections (P. Z. S. London, 1879), Sclater and Salvin record "*Pyrranga azarae*" as having been secured at Cinti and Cangalli, although the number of specimens is not given. Several years later (Cat. Birds Brit. Mus., 11, 1886), Sclater lists two males from Buckley's Cinti collection as *azarae* and two males from Cinti and a female from Cangalli, also from Buckley, as *testacea*. These five skins in the British Museum have been examined for me by Dr. Hellmayr who reports that the two males identified as *azarae* are typical *flava* and the three *testacea* are typical *lutea*. If Buckley's records or data were reliable it would appear that *flava* and *lutea* both occurred at Cinti, in southern Bolivia, in spite of the lack of more recent substantiating evidence. On the other hand, Buckley's collections are believed to have arrived in London without other labels than numbered ones which the dealer who received the skins replaced by others containing details supplied

by the collector. As a result, data and specimens often became badly mixed, and no confidence can be placed in localities ascribed to many of Buckley's species not otherwise confirmed.

The specimens of *flava* probably are correctly labeled and may have come from Cinti since Berlepsch (1912) records this form from Samaipata, Olguin, and San José Misque, and there is a skin in the British Museum from Sucre. The specimens of *lutea* are more likely to have come from the Yungas of La Paz or Cochabamba where Buckley also collected and where *lutea* has been taken by other collectors.

So far as can be known precisely, the range of *lutea* in Bolivia embraces the Yungas of La Paz and Cochabamba, meeting that of *flava* and probably *rosacea* somewhere in the eastern Yungas of Cochabamba and thence extending northwestward into Perú.

North of Perú, *lutea* inhabits similar country in Ecuador. Most of the Ecuadorian records are from the arid tropical and subtropical regions around Zaruma and adjacent localities, and none whatever from the humid tropical regions of the north. At Esmeraldas it reaches sea level and it is probable that its range is more or less continuous from this point to southern Ecuador along the narrow stretch of coast line which Chapman (1926) shows to exist as a prolongation of the arid tropical zone, with a single break in the neighborhood of Valdivia.

Sclater's record of "*testacea*" from Jima, e. Ecuador, was based on a skin in Buckley's collection which was labeled in London by a dealer and may not have come from that locality. Aside from this doubtful one, there is no record from eastern Ecuador.

There appears to be no direct connection with the range of the species in Colombia, and in accord with this discontinuity of range I have found a corresponding disparity in the averages of Colombian and Ecuadorian birds. For this reason I have referred all Colombian birds to *desidiosa* with the exception of those found in the Santa Marta region, which belong to *faceta*.

Throughout Perú and Ecuador (and probably also northwestern Bolivia) the variations of this race show the relationship of adjacent forms. The palest individuals of *lutea* are not far removed from dark examples of *saira*, and dark *lutea* approach *desidiosa*; dull Peruvian specimens strongly suggest *testacea* and bright examples more resemble *faceta*. Ecuadorian skins do not differ appreciably from Peruvian ones.

A slight character has been detected in the series of *lutea* which appears to be of value in distinguishing it from *desidiosa*. The males of *lutea* have a rather distinct pinkish line extending over the lores to the eye and continued around the orbit on the tiny feathers of the eyelids which are distinctly brighter than the crown and auriculars. This pink line is quite noticeable in well-made skins but it is absent from *desidiosa*. Females have a similar character developed in yellow instead of pale red. In *testacea* the line is paler and less marked while in *figlina* the eyelids are more whitish.

Little has been recorded concerning the habits of *lutea*. Stolzmann's notes, printed by Taczanowski (Orn. Pérou), are brief and agree with my own observations. He says that the bird occurs in flocks both in bushes and higher trees and that its alarm note resembles that of a thrush, being unlike the fine whistle of most tanagers. The stomachs of the birds collected contained insects, principally Coleoptera.

The series of this race at hand does not give much information concerning the duration of the molt. A male from Chinchao, Perú, taken on November 8, is in the midst of a full molt, replacing worn olive and yellow by fresh red. A skin from Cullcui, Marañón River, taken December 13, is in full, fresh plumage, olive green, tinged with orange, and orange yellow. A May specimen from Hacienda Limón, Perú, is molting on head, body, wings, and tail, but in a very irregular manner. Whether this indicates a resumption of pre-nuptial molt, a difference in season between Hacienda Limón and Chinchao, or an adventitious renewal of lost plumage it is difficult to say. The irregularity of the renewals and the fact that none of the plumage is very badly worn suggest that the renewals are adventitious. An August male from Vista Alegre, Perú, is in moderately worn red, with irregularly placed yellow and ochraceous brown feathers somewhat fresher than the remainder; the bird evidently has replaced certain parts of the plumage since the previous full molt.

No breeding records are available for this race.

Specimens examined.—Perú: Santa Eulalia 2 ♂; Chinchao 2 ♂ 1 ♀; Vista Alegre 1 ♂ 1 ♀; Cullcui, Marañón R. 1 ♀; Hacienda Limón 1 ♂. Ecuador: Cebollal, Loja 1 ♂¹; Zaruma 1 ♂ 2 ♀¹; Alamor 1 ♂¹; Esmeraldas 2 ♂ 1 ♀¹; Punta Santa Ana, Porto Velho 1 ♀.

¹Specimens in American Museum of Natural History, New York.

Piranga flava desidiosa Bangs and Noble.

Piranga testacea SCLATER and SALVIN (nec SCLATER and SALVIN, 1868), P. Z. S. London, 1879, p. 502—Antioquia, Colombia: SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 292, 1883—part, Colombia: SCLATER, Cat. Birds Brit. Mus., 11, p. 184, 1886—part, Concordia and Antioquia, Colombia.

Piranga testacea testacea RIDGWAY, Bull. U. S. Nat. Mus., 50, pt. 2, p. 86, 1902—part, Colombia, Bogotá: CHAPMAN, Bull. Amer. Mus. Nat. Hist., 36, p. 613, 1917—part, San Antonio, Cocal, Popayan, and La Sierra, Colombia.

(*Piranga*) *testacea* SHARPE, Hand-list, 5, p. 384, 1909—part, Colombia.

Piranga testacea faceta BERLEPSCH (nec BANGS), Ber. V Int. Orn.-Kongr., p. 1064, 1912—part, Antioquia and "Bogota," Colombia.

Piranga testacea desidiosa BANGS and NOBLE, Auk, 35, p. 461, 1918—La Maria, Dagua Valley, w. Colombia; type Mus. Comp. Zool. examined.

P(iranga) t(estacea) desidiosa HELLMAYR, Arch. Naturg., 90, A, (2), p. 190, 1924—w. Colombia; crit.

Diagnosis.—Most like *lutea* but separable by the deeper red of the males and darker, more olivaceous green dorsum of the females; eyelids not paler nor brighter than the cheeks.

Habitat.—Both slopes of the western Andes of Colombia, in the neighborhood of the Cerro Munchique, and on the western side north to the Dagua Valley; probably also parts of the Magdalena Valley (Bogotá collections).

Description.—Males above between Garnet Brown and Nopal Red, sometimes inclining toward Cadmium, with the edges of the forehead somewhat paler; lores dusky gray or whitish with their color spreading a little over the extreme anterior part of the cheeks; auriculars red; eyelids red, not distinctly paler than the cheeks. Throat between Scarlet-Red or Carmine and Spectrum Red; breast slightly duller, nearer Carmine; belly paler, between Spectrum Red and Rose Doree; flanks Nopal Red; under tail-coverts like belly or a little paler. The breast, though deeper in color than the throat, is not strongly shaded with dusky. Wings and tail edged with dark Nopal Red x Pompeian Red. Wing 91-98 mm. (av. 94.5); tail 71-79 (av. 75); exposed culmen 16-19 (av. 17.9); culmen from base 21.5-23.5 (av. 22.3); tarsus 19.5-21.5 (av. 20.3).

Females above Dull Citrine x Buffy Citrine; below Sulphine Yellow x Primuline Yellow, more olivaceous on breast and flanks, sometimes approaching Light Cadmium on throat and belly.

Wing 85-95 mm. (av. 90); tail 71-74 (av. 72.4); exposed culmen 16-18.5 (av. 17.1); culmen from base 22-22.5 (av. 22.1); tarsus 19-22 (av. 20.6).

Remarks.—The birds from the western slope of the western Andes are all very deeply colored. Those from the eastern slope of the same range are not so uniform and show light and dark extremes. Two from San Antonio, Río Cali, Cauca Valley, are deeper than the type; one from Cocal is lighter than some examples of *lutea*; others from La Sierra and Popayan are equal to some *lutea* but darker than most of that race while they are somewhat lighter than the dark extremes of *desidiosa*. On account of the apparent break in the continuity of range between Colombian and Ecuadorian representatives of the species, it seems more desirable to unite these intermediate Colombian specimens with *desidiosa* than with *lutea*.

It is probable that *desidiosa* is found as far east as the Magdalena Valley. Berlepsch records Bogotá among the localities for *faceta*. Hellmayr has examined the single male Bogotá skin in Berlepsch's collection (now in the Senckenbergian Museum of Natural History, Frankfurt) and says (MS.) that it is much darker on the top of the head and back than a series of *faceta*, and darker, more fiery red, beneath. This would seem to place it in *desidiosa*. The skin must have come from some subtropical region and not from the immediate vicinity of the town of Bogotá, and it may have been from somewhere in the Magdalena Valley although recent collectors have not found it or any form of the species in that part of the country.

The material examined does not supply much information regarding molting periods, but it appears that *desidiosa* follows *lutea* and other southern races in this particular. A December and a January male are in fresher plumage than the rest of the series, a March bird is slightly more worn, and May and June specimens are noticeably more abraded.

Specimens examined.—Colombia: La Maria, Dagua Valley 4 ♂ 3 ♀ (including type)¹; San Antonio, Río Cali 1 ♂¹, 1 ♂²; La Sierra, Cauca 1 ♂ 1 ♀²; Cocal, w. of Popayan 1 ♂²; Popayan 1 ♂ 1 ♀².

***Piranga flava faceta* Bangs.**

Pyranga saira SCLATER (nec *Tanagra saira* SPIX), Cat. Amer. Birds, p. 80, 1862—part, Trinidad.

¹Specimens in American Museum of Natural History, New York.

²Specimens in Museum of Comparative Zoology, Cambridge.

Pyranga hepatica LEOTAUD (nec SWAINSON), Ois. Trinidad, p. 291, 1866—Trinidad.

Pyranga haemalea SCLATER (nec SALVIN and GODMAN), Cat. B. Brit. Mus., 11, p. 185, 1886—part, Trinidad.

(*Phoenicosoma*) *saira* HEINE and REICHENOW (nec *Tanagra saira* SPIX), Nomencl. Mus. Hein., p. 17, 1890—part, Caracas, Venezuela.

Piranga haemalea CHAPMAN (nec SALVIN and GODMAN), Bull. Amer. Mus. Nat. Hist., 7, p. 323, 1895—Caura, Trinidad: PHELPS, Auk, 14, p. 364, 1897—San Antonio, Venezuela: ALLEN, Bull. Amer. Mus. Nat. Hist., 13, p. 168, 1900—Bonda, Onaca, Minca, Cacagualito, and Masinga Vieja, Santa Marta, Colombia.

(*Pyranga testacea*) Var. *Haemalea* DUBOIS, Syn. Av., 1, p. 658, 1902—part, Venezuela, Trinidad.

P(yranga) haemalea PENARD and PENARD, Vog. Guyana, 2, p. 449, 1910—part, Guyanas, Venezuela, and Trinidad.

Piranga faceta BANGS, Proc. Biol. Soc. Wash., 12, p. 141, 1898—Santa Marta, Colombia; orig. descr., ♂ (type in Mus. Comp. Zool.): idem, op. cit., 13 p. 104, 1899—La Concepción and San Miguel, Santa Marta, Colombia: ALLEN, Bull. Amer. Mus. Nat. Hist., 13, p. 121, 1900—Santa Marta (ex Bangs).

(*Pyranga*) *faceta* DUBOIS, Syn. Av., 1, p. 658, 1902—Santa Marta: SHARPE, Hand-list, 5, p. 385, 1909—Santa Marta, Colombia.

Piranga testacea faceta HELLMAYR, Novit. Zool., 13, p. 57, 1906—Trinidad (ex Leotaud); crit.: BERLEPSCH, Ber. V Int. Orn.-Kongr., p. 1064, 1912—part, Santa Marta, Colombia; Cumaná, Venezuela; Trinidad: TODD and CARRIKER, Ann. Car. Mus., 14, p. 488, 1922—Minca, Cincinnati, and Las Vegas, Santa Marta, Colombia: HELLMAYR, Arch. Naturg., 90, A, (2), p. 188, 1924—Galipan and Loma Redonda, Venezuela; Rio Mamera near Caracas, Bermúdez (Campo Alegre, Quebrada Secca, and Los Palmales), Venezuela; Aripo Mts., Trinidad; crit.

(*Piranga*) *faceta* BRABOURNE and CHUBB, Birds S. Amer., 1, p. 418, 1913—Colombia, Venezuela, and Trinidad.

Diagnosis.—Males differ from *testacea* by being clearer in coloration, especially below where they are very slightly shaded on the breast; paler and more orange red than *lutea*. Females are brighter in coloration than most of the other forms, being paler and less golden than *saira*, more ochraceous than *macconnelli*, clearer, paler, and less golden than *lutea*, and most like *flava* in the tones of olive and yellow though without the grayish dorsal margins.

Habitat.—From the Santa Marta region of Colombia across northern Venezuela to Trinidad and south of Lake Maracaibo to San Cristóbal, Táchira. Except for Phelps's record from San Antonio, Monagas, just south of the watershed, it has been found in Venezuela only on the northern slope of the northern mountains.

Description.—Males above between Brazil Red and Nopal Red; forehead and upper margin of the lores a little brighter and paler; rump brighter. Lores grayish, tinged with red and with a suggestion of a lighter tint below the eye anteriorly; eyelids a little paler, pinkish; auriculars red with ill-defined pale shaft lines. Under parts between Scarlet and Brazil Red, slightly duller on the breast. Bill somewhat narrower and less swollen than in *testacea* but equaled in this respect by some specimens of *lutea*. Wing (including Bangs's measurements of the type and Hellmayr's measurements of fifteen skins in Munich and Tring museums—Hellmayr, 1924 and MS.) 85-93 mm. (av. 82.4); tail 72-80 (av. 76.4); exposed culmen 16.6-8.5 (av. 17.7); culmen from base (one skin) 22.5; tarsus (two skins) 19-20 (av. 19.5).

Females above Light Citrine or even yellower; whole top of head brighter, Sulphur Yellow x Pyrite Yellow. Breast Lemon Chrome; throat Empire Yellow x Pale Lemon Yellow; belly a little paler; flanks more olivaceous. Lores grayish; sides of head duller than the crown; eye ring bright, pale yellow. Wing (including measurements given by Bangs and a series of ten skins in Munich and Tring museums—Hellmayr, 1924 and MS.) 82-90 mm. (av. 85.6); tail 69-79 (av. 74.2); exposed culmen 15-18.5 (av. 17.4); culmen from base (one skin) 19.5; tarsus (one skin) 19.

Remarks.—The bright, clear coloration of both sexes of this form is its most striking characteristic, suggesting the clarity of *saira* and *macconnelli* but of a darker tone with more of an orange tint and with the top of the head not so strongly differentiated from the back. In addition to the localities given in the synonymy and in the subjoined list of specimens examined, there are records from La Tigrera, Venezuela (Tring Museum) and San Cristóbal and Puerto Cabello, Venezuela (Berlepsch coll., Senckenbergian Mus. Nat. Hist., Frankfort) (Hellmayr MS.).

The breeding season of *faceta* has not been indicated except by Chapman (1895) who mentions a male from Caura, Trinidad, taken April 21, with swollen testes. Todd and Carriker (1922) describe nest and eggs but give no dates. Allen (Bull. Amer. Mus. Nat. Hist., 21, p. 279, 1905) does not record the breeding of this species but says that the general breeding season in the Santa Marta region is from about April 1 to the middle of June.

Bangs (1899) notes molting specimens but gives no specific dates although his series of *faceta* was secured between January and April.

Possibly the so-called molting specimens were in the peculiar mixed plumage which has the appearance of molt but which may persist for the entire season. Todd and Carriker (1922) record four specimens, taken from June 16 to August 2, which are said to show various degrees of transition from green to red plumage, but it is possible that these, too, are in a non-molting mixed plumage. A female at hand from Galipan, Venezuela, dated December 11, retains traces of immature plumage on scapulars, interscapulars, lower rump, lower throat, hind part of crown, posterior auriculars, etc., with the new plumage perfectly unworn; it is evidently in the final stage of the molt. The immature feathers which remain are comparatively unworn.

A specimen from Caracas, Venezuela, taken March 27 and sexed as a male, also has traces of immature plumage, but these are very badly abraded, even in contrast to the rather worn general plumage of olive and yellow. There are a large number of adventitious renewals also in evidence, chiefly on the right side, and abnormality of some sort is suggested. Two April males, from Caracas and Maracay, respectively, show no signs of molt. The Caracas bird is entirely red and slightly less abraded than the Maracay specimen which has a spot of olive on the rump and one of orange on the right flank, while several of the greater and middle upper wing-coverts on the left are olive-tinted. The maxillary tooth is very large in the Maracay male and almost absent in the Galipan female.

Todd and Carriker (1922) record *faceta* as abundant in the foothills and on the lower slopes of the San Lorenzo, mainly on the north and northwest sides, but rare in the Sierra Nevada although reported at Concepción and San Miguel by Brown; also rare at Las Vegas, apparently not favoring the excessive humidity of that side of the mountain. It is suggested that the original habitat was the dry forest of the foothills while as the forest was cut away it advanced to higher elevations, remaining lower down where the forest persisted. Several nests were found. Two were among the roots of overhanging banks by the roadside on mountain slopes; one was in a small shrub about two feet from the ground on top of a bank. The two eggs resembled those of *P. erythromelas*.

Specimens examined.—Venezuela: Maracay 1 ♂; Caracas 2 ♂; Galipan 1 ♀.

Piranga flava haemalea (Salvin and Godman).

?*Ph(oenicosoma) Azarae* CABANIS (nec *Pyranga Azarae* D'ORBIGNY) in SCHOMBURGK, *Reise Brit. Guiana*, 3, p. 668, 1848—part, Pacaraima Mts., British Guiana.

Pyranga haemalea SALVIN and GODMAN, *Ibis*, 1883, p. 205—Roraima, British Guiana: SALVIN, *Ibis*, 1885, p. 211—Roraima: SCLATER, *Cat. B. Brit. Mus.*, 11, p. 185, 1886—part, Roraima: BERLEPSCH, *Ber. V Int. Orn.-Kongr.*, p. 1064, 1912—Roraima.

(*Pyranga testacea*) Var. *Haemalea* DUBOIS, *Syn. Av.*, 1, p. 658, 1902—part, Guyane.

(*Pyranga*) *haemalea* SHARPE, *Hand-list*, 5, p. 385, 1909—Guiana (Roraima): BRABOURNE and CHUBB, *Birds S. Amer.*, 1, p. 418, 1913—British Guiana.

P(yranga) haemalea PENARD and PENARD, *Vog. Guyana*, 2, p. 449, 1910—part, "Guianas—het Binnenland" (ex auctorum).

Piranga haemalea CHUBB, *Birds Brit. Guiana*, 2, p. 523, 1921—Mt. Roraima.

P(iranga) t(estacea) haemalea HELLMAYR, *Arch. Naturg.*, 90, A, (2), p. 190, 1924—British Guiana; crit.

Diagnosis.—Darkest and deepest of all races; resembling *desidiosa* but coloration deeper.

Habitat.—British Guiana: Mt. Roraima, the Pacaraima Mts. near the passage of the Cotinga River, and Quonga.

Description.—Males above Garnet Brown rather than Morocco Red; below Nopal Red rather than Brazil Red; throat paler, Scarlet-Red or Scarlet-Red x Rose Doree, in one specimen quite Rose Doree. No distinct pale eye ring but a few pale plumules on lower eyelid; top of head like the back, forehead not paler; auriculars uniform, like the crown but with the anterior part of the cheeks freckled with whitish. Chest duskier than the throat and middle of breast, while the throat is very much lighter than the pileum. Wing 96-98 mm. (av. 96.7); tail 78-80 (78.5).

Females closely similar to *desidiosa*. Above not certainly distinguishable but the throat brighter, approaching Primuline Yellow; no trace of yellow on the forehead. Wing 91-95 mm. (av. 93); tail 74-79 (av. 76.2).

The above descriptions are those of four males and four females from Roraima, and one male and one female from Quonga, in the British Museum; also one male from Roraima in Tring Museum. These specimens were examined for me by Dr. Hellmayr since no material is available in this country.

Remarks.—The distribution of this form and the meagre information available respecting its habitat render its position somewhat

curious. It appears to possess evident relationship with *testacea* and *desidiosa* and yet it shows no signs of approach to *macconnelli* whose range adjoins its own.

There are two specimens of *haemalea* in the British Museum from Quonga, male and female, and there is a male of *macconnelli* in Field Museum also from Quonga, and three males and one female in the British Museum from the same locality. All were taken in November, 1887, by Whitely. A female of *haemalea* from Quonga, in the British Museum, was taken the last day of October the same year. The male *haemalea* from Quonga and the male *macconnelli* in Field Museum are in full molt. Unfortunately there is little information available concerning the ecological associations of these two races. The normal habitat of *macconnelli* seems to be the campos or lightly wooded savannas, and the evidence, as far as it goes, seems to show that *haemalea* occupies the same sort of country. Whitely's specimens were taken at 3500 feet elevation, according to Salvin and Godman (1885), and on Roraima the savanna, broken by coppices, extends up the slopes of the mountain to an elevation of 5405 to 5890 feet before the forest actually commences, according to the accounts of im Thurn and of Perkins (Proc. Royal Geog. Soc., 1885, pp. 509, 529). Probably the records from the Pacaraima Mountains and Quonga refer to similar regions.

Two possible explanations may be advanced for the occurrence of these races together at Quonga, and both may be correct. Some tanagers are proved vagabonds such as *P. f. flava* is known to be in Argentina (White, 1883), and individuals of this and other races have been found in the forest in non-breeding time associated with vagabond troops of other birds. Thus in October and November, *haemalea* may wander a considerable distance from its breeding range and so enter the region occupied by *macconnelli* which also may wander. On the other hand, the relationship of *haemalea* to *macconnelli* evidently is not directly, but through *faceta*, *desidiosa*, *lutea*, *rosacea*, and *saira* and it is possible that, with a connection so distant, the two forms may meet on common ground and exist together without interbreeding. If so, the case is not without parallel in other species of birds.

Schomburgk's specimen, referred by Cabanis to "*Azarae*," probably belongs here although it is just possible that it belongs to *macconnelli*. The specimen is lost so that its identity can not be determined. It came from the Cotinga River near the passage

through the Pacaraima Mountains, and there is consequent probability that the race to which it belongs will be found in the savanna country bordering the hills along the Brazilian-Venezuelan boundary, in which no collecting has been done.

There are no breeding records for *haemalea*. The molting examples collected in November indicate a possible breeding period in June or a little later. Further study of this interesting form in the vicinity of Roraima and on the borders of the range of *macconnelli* should bring out important information which at present is lacking.

***Piranga flava testacea* (Sclater and Salvin).**

Piranga hepatica SALVIN (nec SWAINSON), P. Z. S. London, 1867, p. 139—Santa Fé, Veragua.

Piranga testacea SCLATER and SALVIN, P. Z. S. London, 1868, p. 388—Chitrá and Calovévora, Veragua: RIDGWAY, Proc. Acad. Nat. Sci. Philad., 1869, p. 133—part, Angostura, Costa Rica; Veragua: ZELEDÓN, Cat. Aves Costa Rica, p. 7, 1882—Costa Rica: SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 292, pl. 19, figs. 1, 2, 1883—part, Chontales, Nicaragua; Angostura, Costa Rica; Veragua: ZELEDÓN, Proc. U. S. Nat. Mus., 8, p. 107, 1885—Costa Rica: SCLATER, Cat. B. Brit. Mus., 11, p. 184, 1886—part, Chontales, Nicaragua; Costa Rica; Calovévora, Chitrá, and Santa Fé, Veragua: ZELEDÓN, An. Mus. Nac. Costa Rica, 1, p. 110, 1887—Pozo Azul de Pirrís, Naranjo de Cartago (=Juan Viñas), and Cartago, Costa Rica: BERLEPSCH, Ber. V Int. Orn.-Kongr., p. 1064, 1912—Chontales, Nicaragua; Angostura, Piriri, Costa Rica; Chitrá, Santa Fé, Calovévora, Veragua.

(*Piranga saira*) var. *testacea* RIDGWAY in BAIRD, BREWER, and RIDGWAY, Hist. N. A. Birds, 1, p. 434, 1874—part, Angostura, Costa Rica; Veragua.

P(iranga) testacea RIDGWAY, Man. N. Am. Birds, p. 455, 1887.

Piranga testacea testacea RIDGWAY, Bull. U. S. Nat. Mus., 50, pt. 2, p. 86, 1902—part, Nicaragua to Veragua: BANGS, Auk, 24, p. 309, 1907—Boruca and Paso Real, w. Costa Rica: CARRIKER, Ann. Car. Mus., 6, p. 855, 1910—Cerro de Santa Maria, La Vijagua, Cariblanco de Sarapiquí, La Hondura, and Boruca, Costa Rica.

(*Piranga*) *testacea* DUBOIS, Syn. Av., 1, p. 658, 1902—part, Nicaragua: SHARPE, Hand-list, 5, p. 384, 1909—part, Nicaragua to Panamá.

Piranga testacea subspecies GRISCOM, Amer. Mus. Novit., 282, p. 10, 1927—Cape Garachiné, Panamá.

Diagnosis.—Nearest to *lutea* from which it is separable by the duller, more brick-red coloration of the males and the slightly lighter under parts and more grayish olive upper parts of the females.

Habitat.—Central America from lower Panamá (Cape Garachiné) to northern Costa Rica (La Vijagua); probably also the province of Chontales, Nicaragua.

Description.—Males above Mahogany Red to near Morocco Red; forehead usually hardly brighter. Lores, point of chin, and anterior malar region dingy grayish with fine reddish tips; auriculars reddish like sides of breast but with inconspicuous whitish shaft lines; eyelids a little paler than the sides of the head, pinkish. Throat Coral Red x Dragons-blood Red to Brazil Red x Pompeian Red; breast Dragons-blood Red x Brick Red to Morocco Red x Madder Brown; belly dull Peach Red x Grenadine; flanks duller. Wing 90-94 mm. (av. 91.8); tail 71-74 (av. 73); exposed culmen 18-19 (av. 18.2); culmen from base 21-24 (av. 22.2); tarsus 20-22 (av. 21). Griscom (1927) records the following measurements of sixteen specimens from Veraguas: wing 88.5-96.5 mm; tail 72-80; exposed culmen 17.5-19.2. A male from Garachiné, Panamá, measures: wing 87 mm.; tail 70.5; exposed culmen 16.

Females above Dull Citrine; below about Sulphine Yellow x Primuline Yellow. Lores, base of malar region, and point of chin whitish; auriculars like sides of breast but with inconspicuous hair lines of pale yellow. Wing 86.5-90 mm. (av. 88.1); tail 70-71 (av. 70.5); exposed culmen 18-19 (av. 18.3); culmen from base 21-24 (av. 22.2); tarsus 20-21.5 (av. 20.5).

Remarks.—The record of this race from the province of Chontales, s. Nicaragua, is based on a young male collected by Belt which has not been examined critically in recent years. Ridgway (1902) thinks it possible that this specimen may be intermediate between *testacea* and *figlina*; it should approach, rather, *albifacies* but may be typical *testacea*.

Carriker (1910) records *testacea* from the upper Caribbean slopes of Costa Rica (above 2000 feet), the central plateau (up to about 5000 feet), and the Pacific slope and lowlands, more especially in the southwestern part of the country. He states that it was found high up in the trees, seldom leaving the heavy forest, but says that he heard it at Boruca which is mixed woodland and savanna; Zeledón reports it from Cartago which is in a cultivated valley. It is probable that it is not restricted to heavy forest but that it also frequents clearings and the edge of woodland, at least in certain seasons, like the other members of the group.

Griscom's discovery of the bird at Cape Garachiné among scrubby growths in an arid tropical region, in February or March, demonstrates the tendency of certain members of this species to visit lower elevations during the non-breeding season. This record

extends the known range of *testacea* some distance southward. The measurements of the Garachiné specimen are slightly smaller than those of other recorded or examined specimens but the difference is small in view of the variation shown by other examples. Taken with the other specimens, the series has a range of measurement about equal to that of *faceta*.

The molting season includes the month of August as is shown by a single specimen, definitely in molt, taken in that month; January, February, and June examples are fresh or moderately worn but not molting. A specimen from Cerro Santa Maria, Costa Rica, taken January 7, appears to be slightly immature. The rectrices are more pointed than in adult birds, the flanks are very obscurely streaked with dusky, and the upper parts have suggestions of dusky centers on the feathers. This bird is probably in its first winter plumage, having molted the preceding August or thereabout.

Specimens examined.—Panamá: Chitrá, Veragua 1 ♂ 2 ♀¹. Costa Rica: Boruca 1 ♂¹; Cerro Santa Maria 1 ♂ 1 ♀²; La Vijagua 1 ♂²; Cariblanco de Sarapiquí 1 ♂².

***Piranga flava albifacies* subsp. nov.**

Type from San José del Sacare, Chalatenango, Salvador. Altitude 3600 feet. No. 18,606 Collection of Donald R. Dickey. Adult male. Collected March 14, 1927 by A. J. Van Rossem. Original number 11,472.

Diagnosis.—Most nearly related to *P. f. figlina* from British Honduras and eastern Guatemala but size larger; general color deeper and redder (less scarlet or brownish red); sides of head whiter, with the lower part of lores, the anterior malar region, and the chin distinctly white, with grayish bases to the feathers; auriculars red or dusky red with prominent white shaft stripes, not brownish with obscure streaking.

Habitat.—Salvador to northern-central Nicaragua; probably adjacent parts of western Honduras.

Description of type.—Above between Morocco Red and Garnet Brown; crown a little brighter; back with indistinct paler margins on the interscapulars. Upper part of lores dusky grayish; lower part of lores, narrow chin spot, anterior malar region, and subocular

¹Specimens in American Museum of Natural History, New York.

²Specimens in Museum of Comparative Zoology, Cambridge.

space white, with partially concealed grayish bases; auriculars Morocco Red, conspicuously streaked with white shaft lines; eyelids pink. Throat between Scarlet-Red and Rose Doree, with an indistinct dusky submalar stripe; breast slightly dusky Nopal Red, approaching dusky Brazil Red on sides and flanks; center of belly paler, approaching the color of the throat; under tail-coverts between dark Rose Doree and Peach Red. Wings Warm Blackish Brown; primaries edged externally with Brazil Red; secondaries, tertials, and upper wing-coverts edged with the color of the back; under wing-coverts Strawberry Pink x Geranium Pink; rectrices Dark Indian Red, edged externally with the color of the back. Maxilla (in dried skin) black; mandible bluish at base with a whitish median area and dusky tip. Feet dark brown. Wing 102 mm.; tail 80; exposed culmen 19; culmen from base 23; tarsus 22.5. Measurement of series: wing 94 (one specimen)—102 mm. (av. 98.7); tail 73-82.5 (av. 78.3); exposed culmen 18-19 (av. 18.4); culmen from base 21-24 (av. 22.6); tarsus 21-23 (av. 22).

Description of females.—Upper parts Yellowish Citrine; crown approaching Pyrite Yellow. Lores with upper part grayish; lower part with chin, anterior malar region and subocular space white; auriculars grayish olive with conspicuous white shaft lines; eyelids whitish. Throat deep Strontian Yellow with traces of a grayish malar line; breast Pyrite Yellow, passing into Citron Yellow or Strontian Yellow on belly; flanks like breast. Bill and feet as in the males. Wing 90-100 mm. (av. 93.7); tail 70-79 (av. 75.5); exposed culmen 16.5-19 (av. 17.8); culmen from base 21-23 (av. 22.2); tarsus 20-23 (av. 21.7).

Remarks.—A male from Matagalpa, Nicaragua, is duller and more orange-tinted than the type but darker than a Mt. Cacaguatique male. It is pure Morocco Red above and between Scarlet and Nopal Red below, with the throat between Scarlet and Rose Doree. It resembles *faceta* above except that the crown is duller (about like the back), the chest is not shaded with dusky, the throat is paler and clearer, and the whole under parts are more orange-tinted and less rosy. It has the distinguishing facial characteristics of *albifacies* and is larger than *figlina* so that it evidently belongs with the present race.

There is some variation among the series of Salvadorian specimens. One topotypical male is paler and pinker than the others and the Mt. Cacaguatique male is more orange-tinted, being light

Mahogany on the back, dark Brazil Red on the crown, Scarlet (x Nopal Red) on the throat, Grenadine x Scarlet on the belly, Grenadine on the under tail-coverts, and Hazel on the flanks.

The specimens examined were taken from December to March and there is none which shows signs of molt. A female taken on March 13 at the type locality is not quite adult. The upper wing-coverts are edged or tipped with buffy olive (whiter on the primary-coverts); the outer secondaries and tips of primaries are edged with grayish white; the innermost secondaries and tertials on one side only are edged with yellowish; the middle rectrices have been renewed while the outer ones are more worn.

Mr. Van Rossem, who collected the Salvadorian specimens, assigns an associational habitat of pine-oak, pine-prairie, and coffee for these birds. The pine-oak preference is shown by all races from this point northward.

Specimens examined.—Salvador: San José del Sacare, Chalatenango, 3,600 feet 6♂ 4♀¹; Mt. Cacaguatique, 3,500 feet 4♂ 4♀¹. Nicaragua: Matagalpa 1♂; San Rafael del Norte 3♀.

Piranga flava figlina (Salvin and Godman).

Piranga hepatica SCLATER and SALVIN (nec SWAINSON), Ibis, 1859, p. 15—e.

Guatemala: COUES, U. S. Geol. Geog. Surv. Terr. (Hayden Surv.), Misc. Publ., 11, p. 355, 1878—part, Guatemala: SALVIN, Cat. Strickl. Coll., p. 192, 1882—Guatemala: SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 291, 1883—part, Honduras: SCLATER, Cat. B. Brit. Mus., 11, p. 185, 1886—part, Guatemala.

Piranga testacea RIDGWAY (nec SCLATER and SALVIN), Proc. Acad. Nat. Sci. Philad., 1869, p. 133—part, Río Manati and Belize, British Honduras: BOUCARD, Liste Ois. Guat., p. 33, 1878.

(*Piranga saira*) var. *testacea* RIDGWAY in BAIRD, BREWER, and RIDGWAY, Hist. N. A. Birds, 1, p. 434, 1874—part, Río Manati and Belize.

Piranga figlina SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 293, 1883—Manati R., Brit. Honduras, ♂ type in U. S. Nat. Mus. examined; Pine Ridge of Poctum, Guatemala, ♀: SCLATER, Cat. B. Brit. Mus., 11, p. 185, 1886—Pine Ridge of Poctum, Guatemala; British Honduras.

Piranga figlina RIDGWAY, Proc. U. S. Nat. Mus., 10, p. 585, 1888—Segovia R., Honduras.

Piranga hepatica AMERICAN ORNITHOLOGISTS' UNION, (nec SWAINSON), Check List, ed. 2, p. 256, 1895—part, Guatemala: idem, op. cit., ed. 3, p. 289, 1910—part, Guatemala: F. M. BAILEY, Birds West. U. S., rev. ed., p. 381, 1921—part, Guatemala.

¹Specimens in collection of Donald R. Dickey, Pasadena.

(*Pyranga*) *hepatica* DUBOIS, Syn. Av., 1, p. 659, 1902—part, Guatemala.

(*Pyranga testacea*) Var. *figlina* DUBOIS, Syn. Av., 1, p. 658, 1902—Guatemala and Belize.

Piranga testacea figlina RIDGWAY, Bull. U. S. Nat. Mus., 50, pt. 2, p. 87, 1902—c. Guatemala (Pine Ridge of Poctum) to s. Honduras (Segovia R.).

P(iranga) hepatica COUES (nec SWAINSON), Key N. A. Birds, ed. 5, 1, p. 349, 1903—part, Guatemala.

(*Pyranga*) *figlina* SHARPE, Hand-list, 5, p. 385, 1909—c. Guatemala to s. Honduras.

Piranga hepatica hepatica CHAPMAN (nec SWAINSON), Bird Lore, 20, p. 147, 1918—part, Guatemala.

Piranga hepatica oreophasma F. M. BAILEY (nec OBERHOLSER), Birds West. U. S., rev. ed., p. 541, 1921—part, Guatemala: idem, Birds N. Mex., p. 666, 1928—part, Guatemala.

Diagnosis.—Similar to *testacea* but larger, with auriculars distinctly brown or somewhat brownish with an admixture of reddish; a more or less distinct whitish semilunar patch below the eye; variable grayish edgings to the interscapular feathers. Females like *albifacies* but back more tinged with brownish; throat deeper yellow; flanks grayer, less olive; under tail-coverts greener, less yellowish.

Habitat.—British Honduras, eastern Guatemala, Honduras and the northern border of Nicaragua.

Description.—The type is Burnt Sienna above, paler and clearer on the upper tail-coverts, redder (approaching dark English Red x Brazil Red) on the top of the head. Lores dull, dusky gray; malar region paler, with an ill-defined semilunar patch below the eye somewhat paler, passing into dark Hazel on the auriculars which have only a suggestion of whitish shaft lines; posterior two-thirds of eyelids pinkish buff. Chin narrowly whitish; throat Grenadine Red x Scarlet, with a faint suggestion of paler streaks and with an ill-defined dusky submalar line; breast a little darker than the throat, about English Red, darker on the sides; middle of belly pale Grenadine Red x Scarlet; flanks duller, approaching Kaiser Brown; under tail-coverts dull English Red with paler tips and edges. Wings blackish brown, edged with light Burnt Sienna; lesser upper wing-coverts Bittersweet Pink. Tail Walnut Brown, edged like the back. Some of the outermost greater upper wing-coverts are finely tipped with pale buff, not strongly pronounced. Wing 95 mm.; tail 75; exposed culmen 19.5; culmen from base 23; tarsus 21.

Males from the Pine Ridge of Poctum are usually less orange and more pinkish than the type, with distinct grayish edges on the

interscapulars, a more distinct semilunar patch below the eye, and more pronounced whitish streaking on the auriculars. They vary from Dragons-blood Red x Nopal Red to Brick Red x Brazil Red above and Rose Doree x Scarlet to Scarlet-Red x Scarlet on the throat. Wing 88-100 mm. (av. 95.2); tail 70-80 (av. 76.2); exposed culmen 18-19.5 (av. 18.5); culmen from base 22-23.5 (av. 22.9); tarsus 21-22 (av. 21.9); measurements include those of one male from Sacklin, Nicaragua, in Munich Museum (ex Hellmayr MS.).

Females as described in the diagnosis. Wing 84-95.8 mm.; tail 64.3-78.7; exposed culmen 17-17.5; culmen from base 23; tarsus 20-21.3; measurements include those of two females from s. Honduras and one female from Guatemala cited by Ridgway (1902).

Remarks.—The type of this race is almost sufficiently distinct from northern Guatemalan specimens to make the identity of the two groups doubtful. The Poctum birds are pinker and less orange than the type, with a tendency toward grayish edges on the back not shown by the Manati River bird. They show a noticeable approach toward *dextra* of eastern Mexico but seem to be closer to the type of *figlina*. There is also a tendency toward *albifacies* in greater length of wing and tail. Whether or not examples from farther west in northern Guatemala (where none have yet been taken) would show further transition toward *albifacies* is open to question. From this general region, *figlina* ranges southward and eastward across Honduras to northern Nicaragua. A male from Segovia, southern Honduras, matches the colors of the type rather exactly, although it has an admixture of olive and yellow feathers which alters the general hue to a more orange tint; it is necessary to examine areas of unmixed plumage to obtain the true tone. Another male from the opposite side of the river in Nicaragua shows undoubted affinity to the type in its dull coloration, lightly streaked brownish auriculars, and small size. A male from the same region in the Munich Museum has been examined by Dr. Hellmayr who advises me that it is *figlina* and not *albifacies*.

As a matter of fact these three males and one female from the Segovia River show as much affinity to *testacea* as to *albifacies* and seem to connect those two races with *figlina*. It is apparent that the direct line of relationship is from *testacea* through *figlina* to *dextra*, while *albifacies* is an offshoot from *figlina*. The connection with *testacea* is somewhere in northern Nicaragua; that with *dextra* is near the boundary line of Guatemala and the state of Tabasco, Mexico.

The only available dated specimens of *figlina* were all taken in February. Consequently no particulars are at hand regarding plumages and molts; the February birds are in full, evenly colored plumage.

Specimens examined.—British Honduras: Manati River 1♂ (type)¹. Honduras: Segovia River 1♂¹. Guatemala: Pine Ridge of Poctum 5♂¹. Nicaragua: Sacklin, Río Wanks (=Segovia River) 1♂ 1♀.

***Piranga flava dextra* Bangs.**

Ph(oenicosoma) hepatica CABANIS (nec *Pyranga hepatica* SWAINSON), Mus. Hein., 1, p. 25, 1850—Xalapa.

Pyranga hepatica SCLATER (nec SWAINSON), P. Z. S. London, 1856, p. 124—part, Orizaba: idem, op. cit., 1857, p. 213—Orizaba, Vera Cruz: idem, op. cit., 1859, p. 364—Jalapa, Vera Cruz: idem, Cat. Amer. Birds, p. 81, 1862—part, Jalapa: SUMICHRIST, Mem. Bost. Soc. Nat. Hist., 1, pt. 4, p. 549, March, 1869—Vera Cruz, from coast up to 3000 meters: COUES, U. S. Geol. Geog. Surv. Terr. (Hayden Surv.), Misc. Publ., 11, p. 355, 1878—part, refs.: SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 291, 1883—part, Jalapa, Orizaba, and Vera Cruz: SCLATER, Cat. B. Brit. Mus., 11, p. 186, 1886—part, Orizaba and Jalapa.

Piranga hepatica CHAPMAN, Bull. Am. Mus. Nat. Hist., 10, p. 40, 1898—Las Vegas, Vera Cruz: ? FRIEDMANN, Auk, 42, p. 551, 1925—Brownsville, Texas.

Piranga hepatica dextra BANGS, Proc. Biol. Soc. Wash., 20, p. 30, 1907—Jalapa, Vera Cruz (type in Mus. Comp. Zool.): PHILLIPS, Auk, 28, p. 87, 1911—Matamoras, Rampahuila, Galindo, Carricitos, Montelunga, and Realito, Tamaulipas, Mexico: CHAPMAN, Bird Lore, 20, p. 147, 1918—Vera Cruz to Nuevo Leon: OBERHOLSER, Auk, 36, p. 75, 1919—Cerro de la Silla, Nuevo Leon; e. Mexico.

Diagnosis.—Nearest to *hepatica* from western Mexico and southwestern United States but a little smaller and somewhat darker; males clearer red above with narrower edges of gray on the feathers of the back; below about the same hue of Scarlet-Red or Scarlet. Females a little greener above. From *figlina* it is separable by darker red coloration of the males, with broader grayish dorsal edges and with a less extensive pale area on the sides of the face anteriorly.

Habitat.—Eastern Mexico from eastern Nuevo Leon through Tamaulipas, Vera Cruz, northern Puebla (Hauchinanga), extreme eastern Oaxaca, and Chiapas, probably to the southern point of Texas.

¹Specimens in U. S. National Museum, Washington.

Description.—Males with back Brick Red, distinctly tipped with gray which wears off as the season advances; lower rump and upper tail-coverts clearer and brighter, about Hay's Russet, very narrowly tipped with gray; top of head brighter, Brazil Red inclining toward Nopal Red. Under parts Scarlet-Red x Scarlet to nearly pure Scarlet, paler and pinker in worn specimens; flanks brownish; breast, sides, flanks, and belly narrowly tipped with pale gray. Point of chin white; lores dusky gray; a semilunar patch of whitish below eye; auriculars dull grayish red with whitish shaft lines, more pronounced anteriorly; eyelids white or pale pinkish; subloral area dull whitish, connecting the lores and chin spot. Wing 93-105 mm. (av. 99.2); tail 76-83 (av. 79.4); exposed culmen 17-19 (av. 18.2); culmen from base 21-23 (av. 22); tarsus 21-22.5 (av. 21.5). Bangs's measurements of the type show wing 96 mm.; tail 74.5; culmen 18.5; tarsus 23.

Females Yellowish Olive x Light Yellowish Olive on back, slightly tipped with grayish; upper tail-coverts clearer, greener; top of head bright Sulphine Yellow, duller and darker on nape. Lores dusky grayish; eyelids white; subocular spot whitish; auriculars olive grayish; point of chin narrowly white. Throat, breast, and under tail-coverts deep Wax Yellow; belly paler; flanks more grayish. Wing 96-100 mm. (av. 98.6); tail 77-79.5 (av. 78.1); exposed culmen 17-19.5 (av. 18.1); culmen from base 21-23.5 (av. 22.1); tarsus 21.5-23 (av. 22.5).

Remarks.—This race is a very good intermediate between *hepatica* and *figlina*, having the grayish edges of various parts of the plumage reduced in width but not lost. It has been recorded (as *hepatica*) by Salvin and Godman from Guatemala on the basis of two specimens without exact localities, one of which, in the Strickland Collection (ex Constancia), probably came from the northeastern part of the country near Vera Paz. These specimens probably are like certain Poctum examples some of which might be referred almost as well to *dextra* as to *figlina* but which I have called *figlina* because of other more clearly marked examples from the same locality; consequently I have transferred these Guatemalan records from *hepatica*, which they cannot be, to *figlina*.

There is just a possibility that the name *hepatica* belongs to this eastern form instead of to the western race where it is usually applied. Swainson described *hepatica* from Real del Monte, Hidalgo, Mexico, a locality near Pachuca and in the eastern drainage although on the

central plateau. Bangs described *dextra* from Jalapa, Vera Cruz, in the same eastern drainage though near the coast. I can find no references to specimens from Real del Monte, except the type and it is possible that the form actually occurring there is really *dextra*, although *hepatica* inhabits the central plateau farther west. Until exact topotypes are available the question will remain open.

A male from Santa Catarina, Nuevo Leon, taken in mid April, is exactly similar in color and size to a number of males of *hepatica* from Coahuila, Jalisco, and Tepic, although the locality, being on the eastern side of the Sierra Madre del Oriente Mountains, is logically within the probable range of *dextra*. A young male (in olive plumage) and a female, both from Cerro de la Silla, Nuevo Leon, which, according to Oberholser (1919) is west of Santa Catarina, appear to be distinctly closer to *dextra*. It is possible that the Santa Catarina male is a vagrant *hepatica*, although it is dated near the breeding season, but it seems more probable that it is an unusually large and gray specimen of *dextra* showing the transition to the adjacent form of the western slopes.

There is a close resemblance between *dextra* and *flava*. The present form is redder, less orange brown above and less grenadine below, with narrower grayish margins above and somewhat more conspicuous grayish margins below, while the top of the head averages a little darker red. In worn specimens of both races these characters are much less apparent and certain examples are very much alike. A specimen of *dextra* from Oaxaca is strikingly similar to an Argentina example of *flava*. Its general tone of coloration is very slightly more orange or brownish and the auriculars are less reddish and more pronouncedly streaked with white; otherwise the two birds are inseparable.

Sumichrast (1869) records "*hepatica*" (= *dextra*) as "everywhere distributed from the coast of the Gulf to an altitude of at least 3,000 meters." I have seen no actual breeding records for this race. Specimens examined are dated January, March, April, June, August, and September and follow the plumage changes of *hepatica*, molting variously from July to September.

Friedmann (1925) recorded a specimen from Brownsville, Texas, which he identified as *hepatica*. From the geographical position of Brownsville in relation to Tamaulipas, Mexico, and the Davis Mountains, southwestern Texas, the nearest localities recorded in the respective ranges of the two races, it seems very probable that

this specimen belongs to *dextra* instead of *hepatica*. It is a straggler in any case but is more likely to have come a short distance north from Tamaulipas along the Gulf coast than to have wandered from considerably farther west. Unfortunately the specimen is said to be in poor condition and preserved in alcohol so that future identification is problematical. If it should prove to be *dextra*, a new subspecies is thereby added to the United States fauna.

Specimens examined.—Mexico: Oaxaca 1 ♂; Jico, Vera Cruz 2 ♂¹; San Vicente Chiapas 1 ♂¹; mountains near Tonata 1 ♂ 1 ♀¹; San Cristóbal 1 ♂¹; Gineta Mountains 1 ♂ 1 ♀²; Cerro de la Silla, Nuevo Leon 1 ♂ 1 ♀¹; Santa Catarina 1 ♂.

***Piranga flava hepatica* (Swainson).**

Piranga hepatica SWAINSON, Philos. Mag., n. ser., 1, p. 438, 1827—Real del Monte, Hidalgo, Mexico: SCLATER, P. Z. S. London, 1856, p. 124—part, Real del Monte: idem, op. cit., 1858, p. 303—La Parada, Oaxaca: BAIRD, Rep. Pac. R. R. Surv., 9, p. 302, 1858—Zuñi and Fort Thorn, N. Mexico: idem, Cat. N. Am. Birds, no. 222, 1859: SCLATER, P. Z. S. London, 1859, p. 377—Talea, Villa Alta, and Choapam, Oaxaca: HENRY, Proc. Acad. Nat. Sci. Philad., 1859, p. 106—New Mexico: KENNERLY, Rep. Pac. R. R. Surv., 10, p. 30, pl. 31, 1859—San Francisco Mts., Arizona: BAIRD, Birds N. Amer., p. 302, atlas, pl. 31, 1860: SCLATER, Cat. Amer. Birds, p. 81, 1862—part?, Mexico: idem, P. Z. S. London, 1864, p. 373—Valley of Mexico: COUES, Proc. Acad. Nat. Sci. Philad., 1866, p. 71—part, Fort Whipple, Arizona: SUMICHRIST, Mem. Bost. Soc. Nat. Hist., 1, p. 549, 1869—Vera Cruz: RIDGWAY, Proc. Acad. Nat. Sci. Philad., 1869, p. 132—crit.: DUGES, La Naturelleza, 1, p. 140, 1870—Guanajuato: COOPER, Orn. Cal., p. 144, 1870—Arizona, etc.: COUES, Check List, no. 109, 1873: BREWSTER, Proc. Bost. Soc. Nat. Hist., 16, p. 108, 1873—descr. eggs?: HENSHAW, Rep. Orn. Spec. Wheeler Surv., p. 108, 1874—Apache, Arizona; habits: BAIRD, BREWER, and RIDGWAY, Hist. N. Amer. Birds, 1, p. 440, p. 20, figs, 9, 10, 1874: idem, op. cit., 3, p. 508, 1874—eggs?: LAWRENCE, Mem. Bost. Soc. Nat. Hist., 2, p. 274, 1874—Sierra Madre, between Mazatlan and Durango: HENSHAW, Zool. Expl. W. 100th Merid., p. 237, 1875—Apache, Willow Springs, Rock Cañon, Bowie Agency, Camp Crittenden, etc., Arizona; habits; descr. nest: LAWRENCE, Bull. U. S. Nat. Mus., 4, p. 19, 1876—Guichicovi, Oaxaca; Gineta Mts.; Chiapas: COUES, U. S. Geol. Geog. Surv. Terr. (Hayden Surv.), Misc. Publ., 11, p. 355, 1878—part, New Mexico and Arizona s. through Mexico; syn.; descr.; habits; eggs: RIDGWAY, Nom. N. Amer. Birds, no. 163, 1881: BREWSTER, Bull. Nutt. Orn. Cl., 6, p. 68, 1881—Chiricahua Mts., Arizona: idem, op. cit., 7, p. 146, 1882—Santa Rita Mts., Arizona; measurements: COUES, Check List, ed. 2, p. 42, 1882: SALVIN and GODMAN, Biol. Cent. Amer., Aves, 1, p. 291, 1883—part, Real del Monte, Guanajuato, valley of Mexico, Sierra Madre, Vera Cruz, La

¹Specimens in Biological Survey Collection, Washington.

²Specimens in U. S. National Museum, Washington.

Parada, Talea, Villa Alta, Choapam, Guichicovi, and Gineta Mts., Mexico; New Mexico; Arizona: BREWSTER, Auk, 2, p. 197, 1885—Santa Rita Mts.: DAVIE, Egg Check List N. A. Birds, p. 16, 1885—descr. eggs?: SCLATER, Cat. B. Brit. Mus., 11, p. 186, 1886—part, Arizona; Villa Alta and Mexico City, Mexico.

Pyranga azarae WOODHOUSE (nec D'ORBIGNY), Rep. Sitgreaves Expl. Zuñi and Col. R., p. 82, 1853—San Francisco Mts., Arizona.

(*Piranga*) *hepatica* GRAY, Hand-list, 2, p. 60, 1870: SHARPE, Hand-list, 5, p. 385, 1909—part, Arizona; Mexico.

(*Pyranga*) *hepatica* COUES, Key N. A. Birds, p. 112, 1872: SCLATER and SALVIN, Nom. Av. Neot., p. 22, 1873: DUBOIS, Syn. Av., 1, p. 659, 1902—part, Arizona; Mexico.

(*Pyranga hepatica*) var. *hepatica* RIDGWAY in BAIRD, BREWER, and RIDGWAY, Hist. N. Am. Birds, 1, p. 434, 1874.

P(yranga) hepatica COUES, Key N. Am. Birds, ed. 2, p. 318, 1884.

Piranga hepatica AMERICAN ORNITHOLOGISTS' UNION, Check List, p. 291, 1886—s. New Mexico and s. Arizona: FERRARI-PEREZ, Proc. U. S. Nat. Mus., 9, p. 140, 1886—Tezuitlan, Puebla; plumages, etc.: SCOTT, Auk, 5, p. 30, 1888—Santa Catalina Mts.; breeding; plumages: DAVIE, Nests Eggs N. Am. Birds, ed. 4, p. 337, 1889—descr. nest: MEARNs, Auk, 7, p. 260, 1890—Mogollon Mts., w. New Mexico; breeding in pine belt: ANTHONY, Auk, 9, p. 366, 1892—Apache, s.w. New Mexico: JOUY, Proc. U. S. Nat. Mus., 16, p. 779, 1893—Barranca Ibarra, Jalisco: FISHER, N. Am. Fauna, 7, p. 109, 1893—confluence of Beaverdam and Rio Virgin, n.w. Arizona: AMERICAN ORNITHOLOGISTS' UNION, Check List, ed. 2, p. 256, 1895—part, s. New Mexico and s. Arizona: NEHRLING, Our Nat. Birds, 2, p. 17, 1896: DAVIE, Nests Eggs N. Am. Birds, ed. 5, p. 408, 1898—descr. nest, eggs: RIDGWAY, Bull. U. S. Nat. Mus., 50, pt. 2, p. 84, 1902—part, Mexican plateau; Arizona; New Mexico: OBERHOLSER, Auk, 19, p. 301, 1902—Chisos, Davis, and Guadalupe mts., Texas: F. M. BAILEY, Birds West. U. S., p. 381, 1902—part, s.w. Texas, c. New Mexico, and Arizona: OSGOOD, Condor, 5, p. 149, 1903—Dragoon Mts., Cochise Co., Arizona: V. BAILEY, Auk, 21, p. 448, 1904—Mesa del Agua de la Yegua and Bernal Mesa, San Miguel Co., New Mexico: SWARTH, Pac. Coast Avif., 4, p. 47, 1904—Huachuca Mts.; breeding; habitat; plumages: REED, N. Amer. Birds Eggs, p. 279, fig., 1904—descr. and fig. egg: BEEBE and BEEBE, Two Bird Lovers in Mex., pp. 306, 395, 1905—Colima, Coquimatlán, Mexico: V. BAILEY, N. Am. Fauna, 25, p. 37, 1905—Guadalupe, Davis, and Chisos mts., Texas, transition zone: SWARTH, Condor, 7, p. 80, 1905—Santa Rita Mts., Arizona: idem, op. cit., 10, p. 114, 1908—Huachuca Mts., Arizona: SMITH, Condor, 10, p. 75, 1908—Whetstone Mts., Arizona: idem, op. cit., 11, p. 59, 1909—Cuernavaca, Morelos: AMERICAN ORNITHOLOGISTS' UNION, Check List, ed. 3, p. 289, 1910—part, n.w. Arizona, n.e. New Mexico and w. Texas: VISHNER, Auk, 27, p. 286, 1910—Catalina Mts., Arizona, above 6,000 feet: LAMB, Condor, 12, p. 78, 1910—w. coast Mexico; San Blas, Tepic: SWARTH, Pac. Coast Avif., 10, p. 62, 1914—Arizona, transition zone; S. Francisco Mts., Mogollon, Santa Catalina, Santa Rita, Huachuca, Chiricahua, and White mts., Fort Whipple, Beaverdam and Vegas rivers: idem, Condor, 20, p. 21, 1918—c. Arizona, 6,000 feet upwards: WILLARD, Condor, 20,

- p. 168, 1918—Huachuca Mts.: CHAPMAN, Bird Lore, 20, p. 153, 1918—plumages: F. M. BAILEY, Birds West. U. S., rev. ed., p. 381, 1921—part, s. w. Texas, c. New Mexico, and Arizona: SWARTH, Condor, 26, p. 189, 1924—San Francisco Mts., Arizona: WYMAN and BURNELL, Field Book Birds S. West. U. S., p. 202, 1925—transition zone of mountains, s. w. United States.
- P(iranga) hepatica* RIDGWAY, Man. N. A. Birds, p. 455, 1887: COUES, Key N. A. Birds, ed. 5, 1, p. 349, 1903—part, s. Rocky Mountain region (U. S.).
- Piranga hepatica hepatica* SMITH, Condor, 19, p. 17, 1917—Davis Mountains, Texas: CHAPMAN, Bird Lore, 20, p. 147, pl., figs. 4, 5, 1918—part, c. w. Texas, c. New Mexico, n. w. Arizona, and tableland of Mexico; migrations: BANGS and PETERS, Bull. Mus. Comp. Zool., 68, no. 8, p. 403, 1928—Chivela, Oaxaca.
- Piranga hepatica oreophasma* OBERHOLSER, Auk, 37, p. 74, 1919—Pine Canyon, 6,000 feet, Chisos Mts., c. w. Texas; ♂: WETMORE, Condor, 23, p. 63, 1921—Williams, Arizona; habits; note: F. M. BAILEY, Birds West. U. S., rev. ed., pp. 501, 541, 1921—part, Texas, New Mexico, and Arizona: idem, Birds N. Mex., p. 666, pl. 71 (part), map 59, 1928—part, n. w. Arizona, c. New Mexico, and c. w. Texas south over tablelands of Mexico (various records from N. Mex.); descr.; habits; nest and eggs; migrations: BANGS and PETERS Bull. Mus. Comp. Zool., 68, no. 8, p. 403, 1928—Chivela, Oaxaca, Mexico.

Diagnosis.—Nearest to *P. f. dextra* from which the males are separable by larger size and paler coloration, with broader grayish edges to feathers of the back. From *flava* the males are separable chiefly by the pale (duller and less red) auriculars with more white on the shafts of the auriculars, on the lores, below the eye, and on the chin. In general the red is brighter and less suffused with the gray which in *flava* not only tips the feathers but also affects the tone of red. Females are grayer above than those of *dextra*; they are almost inseparable from those of *flava* except by a little duller and less greenish auriculars, with more white on the subocular region, not always pronounced.

Habitat.—Western Texas, central New Mexico, and north-western Arizona south through central and western Mexico (west of the Sierra Madre del Oriente range), east to Coahuila, San Luis Potosi, Hidalgo, Tlaxcala, and western Oaxaca; breeding throughout the range in the hills, migrating out of the United States in winter and descending sometimes to sea level.

Description.—Males with back light Hay's Russet or Brick Red, broadly tipped with gray; upper tail-coverts light Brick Red x Hay's Russet; top of head bright Coral Red x Light Brazil Red. Lores dusky gray with lower half whitish continued posteriorly as a whitish semilunar patch below eye; eyelids pale pink; anterior malar region white; point of chin narrowly white; auriculars dull red, tipped with gray and with pale shaft lines not prominent. Throat Scarlet

inclined to a more reddish tone; breast and belly a little paler, Scarlet x Peach Red, with narrow grayish tips; flanks pinkish gray; under tail-coverts Peach Red x Grenadine. In worn specimens the gray edges are worn off leaving the red color purer or clearer. In late breeding season the color may become considerably paler by fading. Wing 98-108 mm. (av. 103); tail 77.5-86.5 (av. 81.7); exposed culmen 16.5-21 (av. 17.9); culmen from base 21-25 (av. 22.7); tarsus 21-23.5 (av. 22.7).

Females about Grayish Olive on back, brighter and greener on rump and upper tail-coverts; top of head greenish Wax Yellow, brighter above lores, greener on nape. Lores dusky gray; eyelids and subocular semilunar patch whitish; chin usually narrowly white, rarely without white. Throat and breast Strontian Yellow to Primuline Yellow, sometimes tinged with Cadmium; belly paler; flanks grayish; under tail-coverts Wax Yellow or Strontian Yellow. Wing 94-104 mm. (av. 99.4); tail 75-87 (av. 81); exposed culmen 15-18.5 (av. 17.2); culmen from base 21-23 (av. 21.8); tarsus 20.5-22.5 (av. 21.7).

A young male has the back with centers of feathers broadly Clove Brown, margined with pale buffy white, giving a pronounced streaked appearance; rump and upper tail-coverts edged with pinkish buff, the central brown streaks narrower; top of head more Olive Buff, finely streaked with brown. Lores dusky gray; eyelids olive buff; subocular semilunar patch indistinct, whitish; auriculars dull olivaceous gray. Chin narrowly white becoming Wax Yellow on upper throat where it has brown apical streaks; lower throat duller, more buffy, with streaks heavier, (breast probably like lower throat but in the specimen at hand the olive-ochre feathers of the adult plumage are appearing); belly and flanks Ivory Yellow, lightly streaked on belly and heavily streaked on flanks; under tail-coverts Chamois. Tertiaries edged and tipped with white; upper wing-coverts tipped with buffy white; primaries and secondaries edged with Yellowish Citrine; rectrices rather pointed, tipped with a yellowish white bar.

Remarks.—The application of the name *hepatica* is open to some question as has been discussed under *dextra*. If *hepatica* should have to replace *dextra* the name *oreophasma* is available for the western race. The separation of *oreophasma* from a southwestern *hepatica* as a distinct race, as proposed by Oberholser (1919), appears to be not fully justified. As restricted by Oberholser, *hepatica* would occupy only central and southwestern Mexico "north to San Luis Potosi; west to central Jalisco (Guadalajara) and western Michoacan;

south to Guerrero and Oaxaca; and east to Oaxaca, Tlaxcala, and Hidalgo." In the breeding season, *oreophasma* would range from Texas, Arizona, and New Mexico south to central Jalisco and northern Coahuila, spreading slightly over the northern part of the range of *hepatica* in winter. The geographical line of separation—southwestward from Coahuila to Jalisco—would be rather curious since it crosses a region rather uniform in general characteristics without defining any well marked faunal region, although such separation is not impossible.

To make the matter difficult of determination, winter birds from central Mexico are useless for comparison since they may be only visitors to the region if the southward movement of the northern birds extends so far. Specimens taken at the breeding season are unsatisfactory because the plumage at that time is so worn and faded that the distinguishing tints may have become obliterated. The most suitable specimens for comparison are those collected during the annual molt after sufficient fresh plumage has been acquired to show the characteristic colors and before the birds have left their breeding ground, or else specimens in full plumage from the extreme ends of the winter ranges where a single form alone exists. Out of the three specimens of the supposed southwestern form which I have seen that answer these requirements, two are matched perfectly by several examples from outside the possible range of that restricted race, and the third has the plumage suffused with an orange tint (as sometimes happens in other races of *flava*) so as to be totally unlike the other two. This specimen has the back Mikado Brown, rather broadly tipped with gray but with an olivaceous tone to some of the feathers which gives a general impression of Wood Brown x Fawn Color; rump a little brighter; top of the head Brazil Red x English Red; throat Grenadine Red; breast and belly Flame Scarlet; under tail-coverts Salmon-Orange x Bittersweet Orange; flanks Tawny-Olive; wings and tail edged with Orange-Rufous; belly and flanks finely tipped with pale gray. These differences from typical "*oreophasma*" are not shown by any other specimen at hand.

In the matter of size, there is no pronounced difference although there is an average difference in the southern birds in the direction of the smaller *dextra*. In the series of males examined, "*oreophasma*" has wing measurements of 101-108 mm. and "*hepatica*" of 98-103 mm. (Oberholser records the type of "*hepatica*" as having a wing of 97 mm.). The exposed culmen of "*oreophasma*" measures 16-21 mm. and that of "*hepatica*" 17.5-18 mm., showing no difference

in average. Additional material might show a lessening of the small difference apparently exhibited in wing measurement; comparatively few specimens are available from southern localities. There is so much variability in size among members of the *flava* group that it does not seem advisable to recognize racial distinction solely on a slight average difference in measurements.

The range of *hepatica* thus may be given as the highlands of Mexico west of the Sierra Madre del Oriente and extending into Texas, Arizona, and New Mexico. In winter the northern birds retreat southward, but there is no direct evidence to show how far south they go or whether the individuals which breed in northern and central Mexico have any southward movement. The latest record from the United States is given by Swarth (1908) as October 25, southern Arizona, and the earliest by Swarth (1904) as April 11, Huachuca Mountains. A record from Alamor, Sonora, January 6, given by Oberholser (1919), indicates that this locality is within the winter range of the species and may be near the point where the southern migration ceases. There is probably a vertical downward movement in winter from the mountains to the lower elevations, sometimes to sea level, but the southern movement may not extend farther than is necessary to insure a mild climate for the wintering birds. If this is true, winter specimens from southern Jalisco, Michoacan, and Mexico are not migrants from the north but resident birds. Only a large series of early post-nuptial specimens from southern Mexico or reports from bird-banding operations can settle the various questions relating to the status and movements of the species in that region.

The series examined was collected variously in January, February, March, May, June, July, August, and October, showing the post-nuptial molt to take place between July and September as has been discussed in some detail in the introductory pages.

The preference of *hepatica* seems to be for pines or oaks at the edge of pines. In the United States it is largely restricted to the Transition Zone at breeding time from about 4,800-9,000 feet, although it descends lower during migrations. The nest is described by Henshaw (1874) as a frail structure made of coarse rootlets and dried plant stems, lined with finer materials, and placed usually on low oak branches. The eggs are said to be three or four in number, pale bluish green, lightly spotted with browns and purples chiefly around the larger end. Breeding is in June and July, according to

various authors. Henshaw gives the call note as composed of a repetition of the syllables "chuck, chuck"; Wetmore (1921) transcribes it as "chewp, chewp."

Specimens examined.—Arizona: Huachuca Mts. 6♂ 4♀; Santa Rita Mts., Madera Canyon 3♂. Mexico, Jalisco: Tuxpan 1♀; San Sebastian 2♂ 1♀¹; Atenguillo 1♂¹. Ocotlan 1♂. Coahuila: Sierra Guadalupe 3♂ 2♀¹. Tepic: Santa Teresa 1♂ 1♀¹. Michoacan: Mt. Tancitaro 1♀¹. Mexico: Amecameca 1♀¹. Guadalajara: Barranca Ibarra 1♂². Oaxaca: Reyes 1♂¹; near Tontepec 1♂¹; La Parada 1?¹. Guerrero: Omilteme 1♂¹. Michoacan: Paticuaro 1♂¹; Querendaro 1♀¹.

¹Specimens in Biological Survey Collection, Washington.

²Specimens in U. S. National Museum, Washington.

